THE ENGINEERING AND MINING JOURNAL.

VOL. XII.—No. 2.—FOURTH SERIES.] NEW YORK, TUESDAY, JULY ,11 1871. [SINGLE COPIES 10 CENTS.

The Viaduct Railway.

THE eagerness with which the first instalment of the stock of the Viaduct Railway has been taken is very significant. The plans of the railway are not yet known to the public except very vaguely. Not one in twenty of the subscribers to the stock has entered into any thorough calculation of the probabilities of profit in the project. But it is seen of all men that the facilities of up-town transit which we now endure are grossly inadequate, and that a new system is inevitable and a proper system cannot fail to be enormously lucrative. Beyond that our only guarantee must be the public confidence in the character and the abilities of the men upon whom the conduct of the enterprise has devolved. This is really the only guarantee ever attainable in like cases, and this avails to make even the projectors of other schemes of transit yield their own conceptions almost without an effort to realize them, when the project of the Viaduct is broached and the names of the projectors of the Viaduct are published. The clear prospect is, that not only will the road be a speedy and enduring economic success, but that it will be an ornament to the city which it traverses and a monument to the men who build it.

Cleveland Iron Works.

THE following is the statement of iron manufacture in 1870, in the city of Cleveland:

	TONS.
Pig iron	18,575
Rails, iron	39,367
Rails, steel	33,000
Rails, steel capped	3,036
Merchant iron	17,956
Boiler, tank and sheet iron	4,250
Forgings	5,775
Nuts, washers, bolts, nails, spikes	10,751
Machinery castings	27,900
Wire, iron and steel	2,160

The consumption during the year of pig and scrap iron was 125,800 tons, and of coal and coke, 372,500 tons. No new mills have been started, but most of those in existence have been extending their capacity. —*Marquette Mining Journal.*

German Torpedoes.

DURING the war the strictest secrecy was observed respecting the torpedoes with which the German coasts were protected, but now further information with respect to them has been laid before the public. Electrical torpedoes and those exploding by concussion were both employed. The latter were charged with 75 pounds of powder, and sunk to a depth of about 3 feet below the surface of the water. Those exploded from the shore by means of electricity were loaded with 2 centners of dualine, a charge which is equal in force to 10 centners of powder. They were sunk at a depth of about 8 feet. The torpedoes which the "Grille" endeavored to place under the keels of the enemy's vessels were not a new invention, but the old offensive concussion torpedoes, 14 inches in diameter and 2 feet in length, which did not prove very effective. At Pillau torpedoes charged with 4 centners of powder were improvised. A company for laying and exploding these engines of war was formed at Kiel. In sinking and taking them up three accidents occurred, and 14 lives were lost.

The Actual Horse-Power of Steam Engines and Boilers.

THE committee appointed some time since by the Franklin Institute, to report upon the method of ascertaining the actual horse-power of engines and boilers, made the following report at a regular meeting of the Institute, held on the 21st ultimo, in Philadelphia:

In a thorough examination of this question, it is necessary at first to advert to the origin of the term "horse-power," and the manner in which it was first used to designate the power of the steam engine.

The early demand for the steam engine was to effect some task before performed by horses, and it became a question of comparison of the new mechanical with the animal motor. From experiments made to determine the actual power exerted by good average horses, it has been found that a horse, working for eight hours per day, will exert a force equal to about 23,400 pounds, and when working for three hours only, will exert as much as 32,900 pounds, raised one foot high per minute. (See *Ure's Dictionary.*)

The example taken as a unit by JAMES WATT, was that given by the heavy dray horses of the brewers of London, whose medium performance in hauling was found to be 150 pounds at two and a half miles per hour, equal to 33,000 pounds lifted one foot high in a minute. This has since remained the standard for a horse-power, both in English, continental, and American practice.

This unit of power exerted upon the piston of the steam engine, measured by the instrument known as an "indicator," is termed the indicated horse-power; and the power given out by the engine to the machinery is the actual or effective horse-power, being the indicated power minus the friction of the engine. There is also the nominal power, a term based upon the size of the cylinder and an arbitrarily assumed speed of piston and pressure of steam. This might also be termed the commercial power of the engine.

WATT, in the construction of steam engines after the type established by him, adopted for the speed of the piston 128 times the cube root of the stroke in feet; and assumed seven pounds as the effective pressure upon the piston. He thus obtained a nominal horse-power, which, under the most unfavorable circumstances, his engines were sure to produce. Then, again, we have the rule of the British Admiralty for marine engines, in which the old assumed pressure of seven pounds is adhered to, but the *actual* speed of the piston is taken into account.

Another rule for the nominal power of high-pressure engines has the authority of BOURNE, who assumes the speed of the piston to be that given by WATT, and the effective pressure on the piston to be three times as great—*i. e.*, twenty-one pounds per square inch. His rule is to multiply the square of the diameter of the cylinder in inches by the cube root of the stroke in feet, and divide the product by 15⅔. Thus we find a great diversity in the rules for estimating the nominal power of engines. This nominal power—the power at which an engine is rated by the maker—has gradually become greater as the speed and pressure have been increased. But in all cases the nominal power is much less than the actual power at which such engine is capable of working, with the average pressure and speed common to engines of that class.

Going back to the historical era of the use of steam, the committee find that, at an early day, although subsequent to WATT's time, the evaporation of a cubic foot of water per hour, from and at the temperature of 212°, was ruled to be the measure of a nominal horse-power. All subsequent authorities, without exception, have adopted this standard. In the steam boiler they make no distinction between the nominal and actual horse-power. There is only one definition of the term, and that is, the evaporation of a cubic foot of water, as previously stated. It is with this definition that we use the term horse-power.

This rule appears yet to be applicable, and it only needs some statements of conditions such as will allow purchasers and sellers to conform to this requirement. For stationary boilers, with natural draft, assuming that the chimneys and flues shall be adequate in size and form to afford the necessary draft, and that the fuel is coal of average good quality, it appears that nearly all writers give about 55-100 square foot of grate to each horse-power of boilers, and as this ratio gives a very small grate for the lesser number of horse-power, about two feet are added as a constant.

Having thus designated the means for burning the fuel, the conditions attached to the horse-power of boilers are within some limit as to quantity of fuel to be used in producing this effect. In other words, the arrangement and extent of heating surface should be such that at least the average result by evaporation of nine pounds of water from and at 212° with one pound of good anthracite coal burned (over and above ashes) shall be attained. As there are 59-48 pound of water at 212° in a cubic foot, it follows that 6.61 pounds of coal will be needed for its evaporation.

By adopting the more convenient number of seven pounds as the amount of coal necessary to evaporate a cubic foot of water, and adding the constant 2 to the product of the number of horse-power by 0.55, we find that in a 10-horse power boiler, with 7½ square feet of grate, there will be consumed per square foot of grate surface 9.33 pounds of coal per hour. A 20 horse-power boiler will have 13 square feet of grate surface, and will burn 10.76 pounds of coal per hour per square foot of grate. A 40 horse-power boiler would have 24 square feet of grate surface, and would consume 11.66 pounds per square foot per hour. A 60 horse-power boiler would have 35 square feet of grate surface, and would consume 12 pounds of coal per square foot per hour.

It may be as well to refer to chimneys and flues, and add that the average height of chimneys above the surface of the grate for stationary boilers should be taken as from 50 to 64 feet, and the sectional area to conform to BOULTON and WATT's rule, (as quoted by BOURNE,) which is, "multiply the number of pounds of coal consumed under the boiler per hour by 12, and divide the product by the square root of the height of the chimney in feet, and the quotient is the area of the chimney in inches at the smallest part. This rule, though appropriate for land boilers of moderate size, is not applicable to powerful boilers with internal flues, such as those used in steam ves-

sels, in which the sectional area of the chimney is from six to eight square inches per horse-power."

The sectional area of tubes or flues, and the setting of the boiler, must also be properly proportioned, so that the escaping gases, as they leave the steam generating surface of the boiler, be not more than 300° above the temperature of the steam.

The above conditions apply particularly to stationary boilers with natural draft. We have no intention, however, to limit the test of a boiler to these conditions of grate furnace and chimney; they are incidentally mentioned as good average practice. When a forced draft is employed, as in a locomotive, we find the heating surface 65 times the grate area, and 80 pounds of coal burned per square foot of grate.

These general conditions, dependent upon each other being fulfilled, namely, a grate surface so proportioned to the draft as to admit easily the combustion of 7 pounds of anthracite coal, or combustible equal to that amount per horse-power per hour, and the escaping gases not over the temperature before mentioned. It may be safely asserted that a boiler so set, of any given horse-power, failing to evaporate that number of cubic feet of water per hour, with that amount of coal, does not produce its nominal high pressure.

We may also state in connection herewith, that a cubic foot of water evaporated into steam is abundance for one actual horse-power, when used in the cylinder of an engine without expansion; when used in a three-port slide-valve engine, cutting off during the last quarter, it will yield about 1½ indicated horse-power, and will give as high as 2½ indicated horse-power, according to the point of cut-off and efficiency of the engine. In usual practice, the feed water will be admitted to the boiler at temperatures varying from 40 to 200°.

In order to evaporate a pound of water of any temperature (T.), there will be required, according to REGNAULT, (212 — T + 966) heat units. A heat heat unit is the amount of heat necessary to raise one pound of water one degree Fahrenheit, and 966 heat units are rendered latent by the conversion of one pound of water of 212° into steam.

The amount of water carried over mechanically with the steam is a feature which must not be overlooked, and the amount determined by one of the available methods. The conditions of cleanliness of the external and internal surface of the boiler, and the maintenance of such cleanliness, cannot well be defined, but it is obvious that such conditions are essential in practice, and that no boiler, without provision made for these purposes, and also for an efficient circulation, can be a complete success.

There are several well-known types of boilers; such as the plain cylinder, the horizontal flue, and horizontal and upright tubular, the horse-power of which, estimated by the heating surface, could easily be established from a series of actual experiments, and a certain minimum amount of heating surface laid down as a rule for practice. It is quite obvious that one of these—the plain cylinder, for example—might be so badly set, or unskillfully fired, that the evaporative duty would be much reduced below the actual standard to which the boiler is entitled. The deficiency could not be said to result from error of form or construction of boiler. Exceptional cases will sometimes occur in no way modifying the general rule herein laid down, namely, that the rating shall be ascertained under what is acknowledged by engineers as good conditions of practice. Were it otherwise, we should see a small boiler giving out its nominal power merely by an intense fire and a red-hot chimney.

Much uncertainty in the purchase and sale of boilers would be obviated if the horse-power were specified in connection with the pounds of combustible to be used per high-pressure (*i. e.*, per cubic foot of water evaporated) per hour. So, also, the term horse-power, when used in reference to steam engines, would be better qualified by the words nominal, indicated, or actual.

With all this variety of requirement it is safe to conclude that the old practice and definition of a nominal horse-power, gives ample protection to the sellers and buyers of boilers, when the conditions long ago established, and herein stated, are admitted.

Your committee refer to the following as original authorities: SMEATON'S Reports; JAMES WATT Annotations to Dr. ROBINSON, in the Encyclopædia; FAREY on the Steam Engine; TREDGOLD Steam Engine; BOURNE'S (Artisan's Club) on the Steam Engine; BOURNE'S Catechism and Handbook; RANKIN'S Steam Engine and Prime Movers; D. K. CLARK, Railway Machinery; FAIRBAIRN on Mills and Millwork; BOX on Heat; PECLET TRAITE DE LA CHALEUR, and other works on heat and the steam engine.

Readers, however, who desire to investigate this subject, will find in RANKIN'S Prime Movers, BOURNE'S several works, especially his Handbook, FAIRBAIRN on Mills and Millwork, and Box on Heat, a complete exhibition of the theory and practice of steam boilers.

The committee have delayed handing in this report, with the expectation of being able to fix upon some definite amount of heating surface required for high-pressures for well known types of boilers. We find, however, that boiler-makers are far from unanimous as to the amount required; neither is their estimate always made upon the basis herein laid down, nor can we find any published account of any extended experiments sufficientiy accurate to warrant the insertion of them in this report.

As it is likely several months may elapse before the committee will be in possession of sufficient facts to satisfy them on this point, they are compelled to defer this portion of their report until a future occasion. In the meantime, they make the request to any engineers who have made or may make investigations bearing on this point (namely, the heating surface required,) to forward the full particulars to the Secretary of the Franklin Institute.

Professor ROBERT E. ROGERS then delivered a brief address on the properties of steam, and the mistakes which occasionally occur among men who have paid more than ordinary attention to the subject. Among other things, he said that he had long since made up his mind that the horse-power of boilers cannot be told by experiments upon a single boiler. He thought that, in the first place, the boiler ought to be experimented upon for the purpose for which it is intended. Recently, a gentleman said he had constructed a boiler so that one pound of coal would turn fifteen pounds of water into steam. This was at once considered impossible. Experiment was tried, and it was ascertained that nine pounds of the water were drawn over by the engine. Mistakes similar to this are made every now and then, and, in order to guide those who are interested in such matters, he moved that the report of the committee be printed in full in the Journal for the use of members.

American Iron Metallurgy Viewed from a German Stand-Point.

BY THOMAS M. DROWN.

IN a series of articles now publishing in the *Berg- und Hüttenmännische Zeitung*, Dr. GUSTAV KLÜPFEL gives an account of a trip made through the United States in the Spring of 1870, to inspect the iron and steel works of the country. His tour of inspection seems to have been very thorough, the data collected reliable, and the conclusions he draws will doubtless be found as worthy the attention of American as of German metallurgists, for whom the articles were originally written. As it is not undesirable to be able to see ourselves as others see us, we make some extracts from Dr. KLÜPFEL'S articles. The frequent praise bestowed on the present stand-point of American iron metallurgy is naturally gratifying, and the criticisms on it may, perhaps, lead to the correction of much loose practice.

The *natural foundations* of the iron industry of America formed a special study of Dr. KLÜPFEL. To his great surprise he constantly encountered extensive and growing works with large production of iron most unfavorably situated with regard to coal and ore, while localities with greater natural advantages seemed overlooked. His criticisms on this point are severe and not very complimentary to American insight, yet his position is that of a disinterested spectator, who merely looks at bare items of cost. That many of our older works in the Atlantic States are relatively less favorably situated today than they were a half century ago, is not to be questioned. But in proportion as his strictures on the iron manufacture in some regions are severe, his enthusiasm over other localities is unbounded. That we possess the finest coal and the finest ore in the largest amounts, he was well convinced, and that there are places naturally fitted for the cheap production of iron was equally evident, but large profits make us, he thinks, somewhat indifferent in regard to the proper location of our iron-works.

Most of the details given by Dr. KLÜPFEL are, of course, already familiar to Americans; we select only such passages for extract, which either compliment or criticise American practice, or afford comparison with the practice of other countries.

The anthracite coal and iron region calls forth his most enthusiastic admiration. Anthracite coal—unknown in Germany—excited his wonder from its purity and its inherent adaptedness to the blast furnace. "The best varieties," he writes, "contain but ¼ per cent. of sulphur, 5 per cent. ash, and 5 per cent. volatile matter, and are superior to German coke." "American iron-masters," he adds, "are so spoilt, that coal containing 1 per cent. of sulphur is considered unfit for the blast furnace."

The substantial character of the works in the anthracite region was a source of surprise to him. American haste and frailty have been so often compared with European caution and solidity, that he expected to find our furnaces partake of the general character of temporary structures. He found, on the contrary, that they were better, more completely and solidly built, than corresponding furnaces in Germany.

Travelling westward, he met the far-famed Ellershausen process in Pittsburgh. Of this he writes:

"The original intention of Ellershausen to replace the puddling process by a simpler and cheaper process has completely failed. The Ellershausen "pig blooms" must still be completely puddled — not simply balled—even though they melt with difficulty. On the other hand, it has, perhaps, some value as a refining process. Its advantages are, therefore, to be viewed in comparison with the old finery, still in use in Low Moor. It is a fact, that the bars made from "pig blooms" are much smoother and finer in appearance than those made from common puddled iron."

The cold rolling mill of JONES & LAUGHLIN, in Pittsburgh, receives particular mention and praise. The thoroughness and care with which all the minutiæ of their operations are conducted, the beauty of the finished product, and the courtesy and liberality of the proprietors, call forth the highest praise from our author.

Of the American practice of coking, Dr. KLÜPFEL speaks in the severest terms:

"The manufacture of coke is astonishingly backward in America, Pittsburgh being the only place where a regular business in coke is established. The greater part of the coke is made in heaps, although, lately, many ovens have been built, but all of them on the old bake-oven system. When we consider how zealously Americans strive to lessen and lighten hand-work, the appearance of an American coking-oven plant cannot fail to create a peculiar impression. We find here several rows, consisting of only 6 to 8 ovens each, with bad draught, no sign of pressing machine to expel the coke, even in cases where the section of the oven would readily admit of it, no opening for filling; in short, the most primitive arrangement, combined with the laborious operation, and yet one so easily obviated, of removing the coke with hooks. As before remarked, at the time of my visit in America (spring of '70), there

was not in the whole country a rational coking plant. But the Americans are now beginning to recognize the want, perhaps on account of the astonishment expressed by so many German engineers, and it will probably not be long before we shall see in Pittsburgh a lucrative coking establishment combined with coal-washing machines. At first, such an undertaking must be enormously profitable, on account of the "dirt cheap" price of small coal, which is well adapted to coking, but is now thrown into the river. In Pittsburgh, coke, which is made only from the purest coal, is sold in large quantities at $3 per ton, from which we can judge how cheap it would be if the present waste of raw material were stopped and a healthy competition established among rational coking establishments, constructed on Belgian-German systems. The impetus that would thus be given to the blast furnace industry can easily be imagined. The properties of Pittsburgh coal appear to be very similar to those of Westphalian coal. Coal and coke are sold in Pittsburgh by the bushel, and, in respect to yield, it is generally estimated that one bushel of coal, weighing 76 lbs., will give, when coked in heaps, one bushel of coke weighing 40 lbs.; when coked in ovens, one bushel of 50 lbs.; that is, a yield of 52½ per cent. in heaps and 65 per cent. in very defective ovens; from which we may conclude that in properly constructed ovens, such as are used in Westphalia, the yield would be 70 per cent."

In Cincinnati, Dr. KLÜPFEL saw a "steam puddling furnace" (doubtless Danks' rotary furnace) in operation, which excited his lively interest. He describes it at length, and, although disposed to consider the statement regarding the saving of fuel with some degree of allowance, he concludes: "It is, however, certain that the furnace fulfils its purpose completely, inasmuch as it obviates the labor of stirring entirely, and also saves time."

Of the Missouri region, Dr. KLÜPFEL writes: "If we turn our attention to the newer furnaces of St. Louis, which employ bituminous coal and coke, and smelt the fine ores of Missouri, we must first of all emphasize the fact that all of them rest on an unnatural foundation, inasmuch as they have not yet succeeded in using the nearest coal, that of Illinois. They employ ⅔ of a non-caking coal from Indiana and ⅓ coke from the neighborhood of Pittsburgh. Under such conditions the production must be necessarily unfavorable, but as an indication of business success may be mentioned, that within two years after the first trial furnace was completed, three competing establishments, with two blast furnaces, were erected. At present, Missouri ore is nowhere exclusively smelted with coke, but from known data we can conclude that for foundry iron the expenditure of coke would not exceed the weight of pig iron produced. With pure compact coke and high furnaces, as in England, results may be anticipated which have not yet been attained in the pig iron manufacture. The first condition for such a result is, however, the preparation of good coke from Illinois coal in the immediate vicinity of St. Louis. The coal mines on the east side of the Missippi reach already near to the river, none of them are yet deep, and the coal is therefore not dearer than in Pittsburgh. Even at the present time, with but little competition, this coal is but $1.50 per ton in St. Louis. The coal thus far mined is, it is true, not so pure as that of Pittsburgh and contains considerable sulphur. As almost all of the blast furnaces west of Pittsburgh employ raw coal, experiments have thus far only been made to employ the Illinois coal in raw state. These experiments, as might have been anticipated, proved complete failures, partly owing to the fusibility of the coal, and partly to the sulphur contained in it; and the conclusion has been universally accepted in St. Louis, that such sulphurous coal is entirely unadapted to the blast furnace. Experiments on a small scale show, however, that it is a very good caking coal with about 15 per cent. ash, and there is, therefore, no ground for assuming that the coal is worse than that enployed in many furnaces in West Germany. On the other hand, it is not to be denied that good coke can only be prepared from the washed coal. St. Louis is at last coming to this way of thinking, and since one of the first German firms in the city has taken the matter in hand, we may expect, before long, to see a coking plant with washing machines arise on the left bank of the Mississippi, opposite St. Louis, which will probably soon have to stand great competition. As the railroad bridge over the Mississippi will be completed within a year, there is nothing in the way of the iron manufacture, including the blast furnaces settling near East St. Louis in the immediate vicinity of the coal mines. Here both coal and ore are to be had cheaper than in Westphalia, for instance, and as St. Louis, in relation to England, possesses a natural protective tariff of $8 to $9 per ton, ($4 to $5 more than the Atlantic States,) it may be well affirmed that here is the soundest foundation in the country for all branches of the iron manufacture, from pig iron to Bessemer steel."—*Bulletin of the American Iron and Steel Association.*

[From the Journal of the Franklin Institute]

The Use of Pulverized Fuel.

By Lieut. C. E. DUTTON, U. S. Ordnance Corps.

[CONCLUSION.]

THERE remains to be considered what modification of the chemical effects of the flame would attend the use of pulverized fuel in the reverberatory furnace. There are certainly differences in the conditions under which the oxidizing or reducing influences of the flame are exerted, as compared with the old method. In the case of pulverized fuel, we have the entire mass of the coal, ashes and all, passing through the hearth. In some parts of the hearth we have free carbon and free oxygen uncombined, which sweep over the surface of the bath, and occasional particles falling into it. Somewhat similar conditions, but less in degree, attend the use of solid fuel, and I cannot but think that the effect of the pulverized fuel in carbonizing or oxidizing the metal will be determined by the conditions of the fuel itself, *i. e.*, whether oxygen or carbon preponderates. Although there is commonly present in the furnace both free oxygen and free carbon, yet the probabilities would seem to be that the metal would still be deoxidized when the oxygen is in any degree in excess of the demands for combustion, and would be carbonized when oxygen is deficient. In the case of puddling, the metal is powerfully protected by the supernatent slag. In heating iron piles, a neutral flame is obviously essential, and it would seem as if such a flame, charged with particles of solid carbon impinging against the soft, white mass, would carbonize it. But if this were actually the case, how does it happen that the piles are not carbonized in the old way by the smoke, which abundantly fills the whole hearth, and is pure carbon in a spongy state, almost molecularly subdivided, and therefore seemingly in a condition most favorable for the production of this very effect. If such action can take place anywhere, it certainly ought to take place in the puddling furnace immediately after balling, and just before the balls are drawn. The purified iron is then not only rolled up out of the slag, and naked to the flame, but is in that peculiar spongy state in which it exposes a very great surface to it, and is at the same time exposed to the highest heat. The abundant experience hitherto had with pulverized fuel shows no such action, and with a properly-managed flame it probably does not occur. As to the use of this fuel for melting wrought iron and steel in open hearths, experience has not yet been sufficient to warrant a conclusion in this regard. In the experiments it would seem that the iron was carbonized to some extent, but the flame was overcharged with fuel.

II. *The Use of Pulverized Coal in Generating Steam.* The foregoing considerations are, with suitable modifications, applicable to boiler practice. As every fuel has the power of generating by combustion a fixed quantity of heat—a quantity which it is at present impossible to convert into its maximum useful effect by any method—the problem therefore becomes a question as to what is the method which will enable us to approach most nearly to this maximum useful effect. Part of the potential heat is never developed, because not all of the carbon and hydrogen can be oxidized, or rather peroxidized. Part of the heat developed by combustion is carried out at the chimney, and lost altogether, thus failing to exert any useful effect by absorption into the boiler. Part of the heat absorbed into the boiler is lost by radiation from the external shell before it can be converted into work in the steam cylinder—and so on; each source of loss being very serious, and robbing the engineer of a large percentage of his resources. The ultimate store of power which he is able to convert to actual uses is but a small percentage of the whole amount originally contained in his fuel. The use of pulverized coal involves a striking economy by the prevention of loss from two of the sources just mentioned, viz., from imperfect combustion and from failure to absorb all the heat generated. It does not, indeed, prevent *all* losses from these causes, but materially reduces them. The defects of the grate-burning method have, perhaps, been sufficiently discussed. Many attempts have been made to overcome them, and some valuable improvements have been accomplished, the most important of which are devices for admitting air over the fire. But, inventions intended to regulate the supply of air in conformity with the progress of combustion in the coals, and those intended to consume smoke, have fallen into general disfavor, so far as economical results are concerned. They all involve inconveniences or losses which more than compensate their advantages. The essential conditions upon which a real economy of combustion must be founded are well enough understood, but the difficulty of attaining them has been inherent in the defects of the mode by which air and fuel are made to react upon each other. The admission of air over the grate is only a partial remedy, and fails to effect the one all-important condition of instantaneous and perfect intermixture. Considerable quantities of smoke and carbonic oxide have always been, and always must be, carried from the grate through the flues into the atmosphere, so long as this mode of firing is continued. But a source of loss quite different from imperfect combustion will appear when we come to examine into the conditions attending the transmission of heat from the gases to the heat-absorbing surfaces and interior of the boiler. In order that heat may be transmitted from one material to another, it is necessary that the temperature of the two be different, and the rate at which it is transposed will be a positive function of this difference. Again, the transmission of heat through a plate of metal requires time, and the longer the heat-giving body is in contact with the plate, the more heat will be transmitted. It has been stated that the average amount of air-supply to the grate is, at least, twice the theoretical quantity necessary for complete combustion. This amount is found practically to give the best results, on an average, with that method of firing. Let us assume, as no doubt can be easily shown in practice, that the air supply for pulverized fuel need not be more than fifty per cent. in excess of the theoretical minimum. We have at once a diminished volume of escaping gases, and a corresponding increase in their temperature. In effect, then, we have a largely-increased difference between the temperatures of the two sides of the plate, and an increased transmission. But this is not all. The rate at which heat is transmitted increases in a higher ratio than the difference of these two temperatures. For example, let us take two cases, one of a plate whose interior surface is in contact with water at 250 deg., and its exterior in contact with gases at 1000 deg.; the other of a plate whose interior is in contact with water at 300 deg., and its exterior in contact with gases at 1300 deg. Now, not only will the transmission be absolutely greater in the second case than in the first, by reason of the wide difference of

temperature in the two surfaces, but it will be *greater for each degree of difference.* Again, a reduction in the volume of gases implies a corresponding reduction in the velocity with which they pass through the flues, and therefore increases, in the same ratio, the time during which they are in contact with the heat-absorbing surfaces.

It must be borne in mind that the advantages here indicated are not peculiar to pulverized fuel alone, but are applicable to all flames of a high temperature. The superior economy of high temperatures over lower ones (so long as they are not destructive to the boiler or fire-chamber) is a principle susceptible of the fullest demonstration.

The foregoing discussions are by no means wholly new. The principles and facts involved in grate-burning have long been understood to be substantially as stated, and have been practically assumed in all rational attempts to construct smoke-burning fire-boxes. Mr. BOURNE, in his great treatise on the steam engine, has illustrated and discussed them in his descriptions of numerous contrivances for this purpose. The abatement of the smoke nuisance is one of the great problems of English mechanical engineering, having been made the subject of innumerable patents and several parliamentary investigations; but such investigations seem to have ended just where they began—in smoke. Hence, no doubt, Mr. BOURNE was led to make the following significant statements: "Nearly all the expedients hitherto introduced for burning smoke in locomotives, are adaptations of the devices heretofore in use for burning smoke in land-engine furnaces; but the rapid combustion which a locomotive boiler requires, renders the burning of smoke by any of these ancient devices a matter of very difficult achievement, and it seems to be indispensable that a method founded on a totally new principle should be introduced. It appears to us that the fuel and the air must be fed in simultaneously; and the most feasible way of accomplishing this object seems to be in reducing the coal to dust, and blowing it into a chamber lined with fire-brick, so that the coal-dust may be ignited by coming in contact with red-hot surfaces after having been mingled with the quantity of air necessary for combustion. This, however, in common with other improvements upon the locomotive, requires to be worked out."

The foregoing discussions have been based upon the assumption that the conditions of burning pulverized fuel are realized in the manner calculated to yield the best results. The present stage of this invention lacks, as yet, some few requisites of completeness, and is by no means without practical difficulties. Of these, the most important relates to the manner of igniting the dust. It would seem that, in order to be perfect in its action, the flame of the fuel should be self-sustaining, and keep up the ignition steadily from the mouth of the tuyere, without any adventitious aid from a gas generator. If the gas generator be removed while the fire is under full headway, there will be no falling off in the flame at first. On the contrary, if the supply of air be regulated by the requirements of the coal, the heat will be more intense, but at the same time the point of ignition will slowly push forward into the furnace, and the brickwork around the tuyere, being thus removed from or abandoned by the flame, will cool down. Now, it might seem as if this could be remedied by diminishing the velocity with which the fuel and air are poured into the furnace, which might be done by increasing the aperture of the tuyere. Supposing this to be practicable, instead of having a constant position where the ignition would commence, that position would be one of unstable equilibrium, in which a slight variation of circumstances would cause the flame either to advance into the furnace or recede into the pipe. In a word, it is necessary to determine definitely the point of ignition, and there seems to be no way of doing it better than by bringing the coal in contact with burning gas. Now, the generator, which accomplishes the ignition, is otherwise detrimental to the highest effect of the fuel, since, so far as it goes, it reproduces all the disadvantages of grate-burning, with its excessive supply of air, which takes up heat and diminishes temperature; but since it is made very small—as small, indeed, as practicable—its effect is correspondingly small in diluting the effect of the fuel. It is to be hoped, however, that the rare ingenuity of the inventors will enable them to discover some equally certain means of igniting the fuel, without even these small disadvantages.

In conclusion, there is appended the statement of Messrs. WHELPLEY & STORER, of the work performed by their pulverizers.

"The 18-inch pulverizer, commonly applied to furnaces, reduces 200 pounds per hour of anthracite coal, the proportions of size being about like the yield of mill-stones. It requires about 3½ horse-power to effect this. The same power reduces 300 pounds of bituminous coal, a large proportion of it being very fine. The entire yield will burn easily, wafted through a hot furnace. A 42-inch pulverizer, requiring about 15 horse-power, will deliver 1000 to 1200 pounds of anthracite per hour, 2000 pounds of bituminous coal, 2500 to 3000 of quartz, 2000 to 2500 pounds of top cinder, 3500 to 4000 pounds of limestone, 900 pounds of unburned bone, and 50 bushels of wheat. With an increase of power, we have ground one bushel of wheat per minute, finer than is done with mill-stones, and 6000 pounds of copper ore in limestone gangue.

"A comparison of these figures with stamp-work, or any other method of pulverizing, would show very great economy, whether in cost of machines, attendance, wear and tear, or power consumed."

The Oil-Bearing Limestone of Chicago.

By T. STERRY HUNT, LL.D., F.R.S.

(Read before the American Association for the Advancemen of Science at Troy, August, 1870.)

WHEN, in 1861,* I first published my views on the petroleum of the West, I expressed the opinion that the true source of it was to be looked for in certain limestone formations which had long been known to be oleiferous. I referred to the early observations of EATON and HALL on the petroleum of the Niagara limestone, to numerous instances of the occurrence of this substance in the Trenton and Corniferous formations, and, in Gaspé, in limestones of Lower Helderberg age. Subsequently, in Silliman's journal for March, 1863, and in the Geology of Canada, I insisted still further upon the oleiferous character of the Corniferous limestone in southwestern Ontario, which appears to be the source of the petroleum found in that region. I may here be permitted to recapitulate some of my reasons for concluding that petroleum is indigenous to these limestones, and for rejecting the contrary opinion, held by some geologists, that its occurrence in them is due to infiltration, and that its origin is to be sought in an unexplained process of distillation from pyroschists or so-called bituminous shales. These occur at three distinct horizons in the New York system, and are known as the Utica slate, immediately above the Trenton limestone, and the Marcellus and Genesee slates which lie above and below the Hamilton shales; the latter being separated from the underlying Corniferous limestone by the Marcellus slate.

First, these various pyroschists do not, except in rare instances, contain any petroleum or other form of bitumen. Their capability of yielding volatile liquid hydrocarbons or pyrogenous oils, allied in composition to petroleum, by what is known to chemists as destructive distillation, at elevated temperatures, is a property which they possess in common with wood, peat, lignite, coal, and most substances of organic origin, and has led to their being called bituminous, although they are not in any proper sense bituminiferous. The distinction is one which will at once be obvious to all those who are familiar with chemistry, and who know that pyroschists are argillaceous rocks containing in a state of admixture a brownish insoluble and infusible hydrocarbonaceous matter, allied to lignite or to coal.†

* Montreal Gazette, March 1, and Can. Naturalist, July, 1861.
† Silliman's Journal, II., xxxv., 159-161.

Second, the pyroschists of these different formations do not, so far as known, in any part of their geological distribution, whether exposed at the surface or brought up by borings from depths of many hundred feet, present any evidence of having been submitted to the temperature required for the generation of volatile hydrocarbons. On the contrary, they still retain the property of yielding such products when exposed to a sufficient heat, at the same time undergoing a charring process by which their brown color is changed to black. In other words, these pyroschists have not yet undergone the process of destructive distillation.

Third, the conditions in which the oil occurs in the limestones are inconsistent with the notion that it has been introduced into these rocks by distillation. The only probable or conceivable source of heat, in the circumstances, being from beneath, the process of distillation would naturally be one of ascension, the more so as the pores of the underlying strata would be filled with water. Such being the case, the petroleum of the Upper Silurian and Lower Devonian limestones must have been derived from the Utica slate beneath. The rock, however, is unaltered, and, moreover, the intermediate sandstones and shales of the Loraine, Medina, and Clinton formations are destitute of petroleum, which must, on this hypothesis, have passed through all these strata to condense in the Niagara and Corniferous limestones. More than this, the Trenton limestone, which, on Lake Huron and elsewhere, has yielded considerable quantities of petroleum, has no pyroschists beneath it, but on Lake Huron rests on ancient crystalline rocks, with the intervention only of a sterile sandstone. The rock-formations holding petroleum are not only separated from each other by great thicknesses of porous strata destitute of it, but the distribution of this substance is still further localized, as I many years since pointed out. The petroleum is, in fact, in many cases confined to certain bands or layers in the limestone, in which it fills the pores and the cavities of fossil shells and corals, while other portions of the limestone, both above, below, and in the prolongation of the same stratum, though equally porous, contain no petroleum. From all these facts, the only reasonable conclusion seems to me to be that the petroleum. or rather the materials from which it has been formed, existed in these limestone rocks from the time of their first deposition. The view which I put forward in 1861, that petroleum and similar bitumens have resulted from a peculiar "transformation of vegetable matters, or in some cases of animal tissues analogous to these in composition," has received additional support from the observations of Lesley,* in West Virginia and Kentucky, and from the more recent ones of Peckham.†

[TO BE CONCLUDED.]

* Rep. Geol., Canada, 1826, 240, and Proc. Amer. Philos. Soc., x., 183, 187.
† Ibid, x., 415.

The Third Avenue Railroad.

THIS Company run its first cars October 10, 1853, and carried on the first day 22,000 passengers.

The Company has 1,800 horses, 300 passenger cars, and employs 800 men in doing its work. Their depot is an immense structure built of brick. Another story will soon be added to the depot. The contract for the iron, which is to cost $135,0000, was signed on Wednesday last. The whole improvement will cost over $200,000. The length of this road is eight miles, and the average time of a trip is one hour and twenty minutes.

Corn and oats are ground and mixed by steam power with cut hay for the "feed" of the horses, and weekly 3,700 bushels of the above grains and 450 bales of hay are used.

This Company carried last year 25,500,000 passengers, and its average daily receipts are $3,500, while on "extra" days they run up to $5,000 per day.—*N. Y. Daily Witness.*

THE COAL TRADE.

B. R. WESTERN, COAL EDITOR.

Anthracite Coals.

NEW YORK, July 7, 1871.

WHOLESALE.—There is a marked improvement in trade this week. Every body is busy. Buyers now realize that coal is as low as it can possibly be, and leave a margin of profits to those concerned in mining and transporting it. They also see that the chances of an advance are imminent, should any accident, such as a break in one of the canals, a freshet, or something of the sort, occur. Retail dealers are apt to put off buying coal until the last notch has been reached—fearing that their neighbor should put in his coal at 25c. per ton less. They should take into consideration the fact that their neighbor by purchasing later in the season also gets more dirt with his coal. In warm, dry weather coal comes to market in a much cleaner and purer state than in wet, winter weather, and we have no doubt that there is fully five per cent. difference in the actual amount of good coal in a ton. Besides this, freights are apt to advance. We think upon the whole that coal bought during this month will be as cheap as any this season.

The Lehigh Coal Exchange met immediately after the Scranton sale of last week, and adopted the following prices for July delivery. The demand for Lehigh coal is far ahead of the supply, and the whole estimated product for July is already sold. Parties wanting Lehigh coal this fall had better speak for it soon. Lump is entirely out of the market, all orders are positively refused for it.

NEW YORK LEHIGH COAL EXCHANGE.

NEW YORK, June 29, 1871.

At a meeting held this day, the following prices were adopted for July shipments at Elizabethport, Port Johnson, and Hoboken.

Lump	$6 25
Broken	5 65
Egg	5 50
Stove	6 00
Chestnut	4 85

E. BELKNAP, Secretary.

The Wilkesbarre Coal and Iron Company have made the following prices for July: Lump, $4 75; Steamer, $4.75; Broken, $5.00; Egg, $5.25; Stove, $5.75; Chestnut, $4.75—at Hoboken and Port Johnston, N. J.

The Lehigh Coal and Navigation Company quote the following for "Old Company Lehigh Coal," at Port Johnston: Lump, $6.25; Broken, $5.65; Egg, $5.50; Stove, $6.00; Chestnut, $5.00.

Messrs. G. B. LINDERMAN & Co. are offering their superior "Franklin Coal" at—Lump, $4.75; Steamer, $4.75; Broken, $5.00; Egg, $5.25; Stove, $5.75; Chestnut, $4.75—on board. This is a little softer coal than "Lehigh," but in every other way is well worthy of recommendation to the public.

The Scranton Company offer their coal, surplus from the last sale, at: Lump, $4.70; Steamer, $4.80; Grate, $5.10; Egg, $5.50; Stove, $5.75; Chestnut, $4.75—on board at the Port.

WHITE, FOWLER & SNOW, agents for Room Run and West Lehigh Coals quote as follows: Lump, $6.25; Broken, $5.65; Egg, $5.50; Stove, $6.00; Chestnut, $5 00. There is a large business done in these coals, and they stand very favorably with buyers.

There is a good business being done in Schuylkill Coals, at from $4.75@5.75.

At retail the price remains firm at from $5.75 to $6.75 for Pittston Coal, buyer paying cartage. Other company coals are selling from $6 to $7.50 delivered. Lehigh, for furnaces, sells readily at from $8 to $8.50. Many families are laying in winter's supply.

There has been a slight advance in freights, say from 10 to 15 cents, particularly to points around the Cape. The following circular explains itself:

CENTRAL RAILROAD CO. OF NEW JERSEY.

GENERAL OFFICE, 119 LIBERTY STREET.

NEW YORK, July 1st, 1871.

NOTICE TO COAL SHIPPERS.

From this date, until further notice, the following tolls per ton, will be charged by this Company, on Coal Shipments from Penn Haven, Mauch Chunk and Phillipsburg, to the several tide points named.

	From P. Haven.	From M Chunk.	From Phillipsburg.
To Mauch Chunk	$0.15	.....	.....
To Phillipsburg	1.09	$0.85	.....
To Elizabethport	2.26	2.11	$1 26
To Port Johnston	2 26	2.11	1.26
To Newark	2.62	2 47	1.62
To Hoboken	2.26	2 11	1.26

The rate on Coal for way points on the New Jersey Railroads, will be $1.15 per ton, from Mauch Chunk to Phillipsburg.

The above tolls do not include Wharfage or Shipping Expenses at tide ports.

SAMUEL KNOX, Secretary. R. E. RICKER, Sup't and Eng'r.

Anthracite Coal Trade for 1870 and 1871.

The following table exhibits the quantity of Anthracite Coal passing over the following routes of transportation for the week ending July 1, 1871, compared with week ending July 2, 1870.

COMPANIES.	1870. WEEK.	1870. TOTAL.	1871. WEEK.	1871. TOTAL.
*Phila & Reading R.R.	44,327	1,136,142	123,669	1,465,279
Schuylkill Canal	2,548	80,749	39,126	327,965
Lehigh Valley R. R.	60,084	1,611,332	61,776	690,995
Lehigh & Sus. R. R.	22,761	482,001	37,715	443,023
Lehigh Canal	27,430	200,589	20,317	104,652
Scranton North	17,626	335,985	20,037	111 042
" South	35,405	895,046	47,071	241,899
Penn. Coal Co., rail	25,063	553,794	28,457	151,700
" " " canal	955	7,406	501	2,523
Del. & Hud. Canal Co.	49,234	647,059	36,491	218,101
" " East	3,839	209 867	11 333	98,827
" " West	393	38,599	3,429	26,012
South	12,466	218 207	12,224	85,901
Shamokin	9,092	164,713	14,092	308,290
Trevorton	2,117	42 230	..	....
Lykens Valley Coal Co.	....	14,222	2,140	40,436
Wyoming South	4,329	119,562	....	....
Wyoming North	....	....	....	....
P. N. Y. C. & R. R. Co.	6,051	141,655	....	67,556
Williamstown Co'y	....	133,247	....	....
Big Lick Col	2,026	26,725	3,348	60,849
Total	325,746	7,041 129	461,726	4,434,940
1870		4,434,940	325.746	
Decrease		2,606,190		
Increase				135,980

* Less coal transported for Co's use and Bituminous coal.

Bituminous Coal Trade, 1870 and 1871.

The following table exhibits the quantity of Bituminous Coal passing over the following routes of Transportation for the week ending July 1, 1871, compared with week ending July 2, 1870.

COMPANIES.	1870. Week.	1870. Year.	1871. Week.	1871. Year.
C. & O. Canal	17,220	250,750	21,164	310,144
B. & O. R. R.	17,751	409,333	29,665	619,824
H. & B. T. R. R.	7.206	155,991	6,856	184,657
Harrisburg & D.	16,229	391,631	17,930	413,206
L. V. R. R.	1,607	8,229		41,737
P. & N.Y.C. & R. Co.	5,612	118,662		147,666
Cumberl'd Branch Canal	3,468	46,513	6,081	89,268
" Railroad	2,341	49,330	1,601	37,624
Total	71,434	1,410,439	83,297	1,835,126
			71,434	1,410,439
Increase.			11,863	425,687

Report of Coal Transported over Lehigh Valley Railroad

Report of coal tonnage for week ending July 1, 1871, previously this season, compared with same time last year:

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	TOTAL Tons. Cwt
Total Wyoming	18,414 05	206,536 12
" Hazleton	35,146 13	261,765 04
" Upper Lehigh	140 07	532 13
" Beaver Meadow	8 256 08	83,699 11
" Mahanoy	14,348 15	262 701 17
" Mauch Chunk	160 11	5,601 07
" Sullivan & Erie	57 15	84 00
Total Anthracite	76.524 14	820,971 04
Bituminous Coal from all sources		41,737 00
Total by rail and canal	76,524 14	862,708 04
Same time last year	87.635 12	1,956,353 02
Increase		
Decrease	11,110 18	1,093,644 18
Forwarded East from Mauch Chunk by rail	61,775 15	690,994 13
Same time last year	60,084 02	1,611,332 05
Increase	1,691 13	
Decrease		920,337 12

RECAPITULATION.

Forwarded East from Mauch Chunk by rail	61,775 15	690,994 13
To N. C. R. R., at Mount Carmel		2,967 13
Forwarded North from L. & B. Junction	10,407 01	78,136 08
To L. & S. R. R. at Packerton for rail	76 09	3,089 05
Delivered at M'h Chunk		441 16
Delivered on line of road above Mauch Chunk	170 10	5,073 18
Delivered above Mauch Chunk for use of L. V. R. R.	1,095 03	25,029 12
To L. & S. R. R., at Penn Hav., for railroad		94 10
Do. for canal	1.899 09	9 027 18
At M. Chunk for canal	1,100 07	6,145 11
Total Anthracite	76,524 14	820,971 04
Bituminous Coal		41,737 00
Total all kinds	76,524 14	862,708 04

Philadelphia & Reading Railroad and Branches.

COAL TONNAGE

For the Week ending Saturday, July 1, 1871.

BY RAILROAD—ANTHRACITE.

PASSING OVER MAIN LINE AND LEB. VAL. BRANCH.

	Tons.	Cwt.
From St. Clair	45.757	11
" Port Carbon	7.272	10
" Pottsville	2.461	08
" Schuyl'kill Haven	39 902	03
" Pine Grove	7.542	14
" Tamaqua	18,486	04
" Harrisburg		
" Dauphin	6,552	07
Total	127,874	17

FOR SHIPMENT BY CANAL.

Passing Frackville Scales	11,040	01
" Mill Creek	2,821	16
" Schuylkill Valley Scales	1 571	07
" Mt. Carbon	2.145	13
" Cressona	14,634	12
" Pine Grove		
" Tamaqua	2,3.7	06
Total	31,281	09

SHIPPED WESTWARD VIA NORTHERN CENTRAL RAILROAD.

Passing Locust Gap	1,957	07
" Shamokin	2,602	11
" Herndon		
Total	4,559	18

SHIPPED WEST OR SOUTH FROM PINE GROVE.

Via Schuylkill & Susquehanna R. R.	1,257 12
" Lebanon & Pine Grove Branch	831 19
Total	2,089 11

CONSUMED ON LATERALS.

From Frackville Scales	713 11
" Mill Creek "	152 19
" Schuylkill Valley Scales	546 08
" Mt. Carbon "	813 14
" Cressona "	118 08
" Pine Grove "	178 01
" Tamaqua "	231 12
Total	2,776 12

LEHIGH AND WYOMING COAL.

Received via Allentown, E. Penn'a Br.	36 13
" " Alburtis, " "	30 11
" " Oreland, G. & N. Br.	1,065 09
" " Connecting R. R.	
" " Willow Street R. R.	127 02
Total	1,259 15

BITUMINOUS.

From Harrisburg	11,407 08
" Connecting R. R., G. & N. Br.	
" Junction R. R.	114 17
Total	11,522 03

COAL FOR COMPANY'S USE.

Anthracite	3 138 00
Bituminous	316 01
Total.	3,454 01

RECAPITULATION.

	Total for Week.	Corresponding week last Year.	
Passing over Main Line and Leb. Val Branch	127 874 17	46,605 07	i 81,269 10
For Shipment by Canal	34,251 00	4,085 17	i 30,145 03
Shipped Westward via Northern Central R. R.	4,559 18	4,063 06	i 496 12
Shipped West or South from Pine Grove	2,089 11	189 14	i 1,899 17
Consumed on Laterals	2,776 12	2,907 17	d 131 05
Lehigh and Wyoming Coal	1,259 15	3,399 17	d 2,140 02
Total Anthracite paying fr'gt	172,791 13	61,251 18	i 111539 15
Bituminous	11,522 03	10,035 02	i 587 01
Total of all kinds paying fr'gt	184,313 13	72,187 00	i 112126 16
Coal for Company's use	3,454 01	1,646 00	i 1,808 01
Total Tonnage for Week	187,767 17	73,833 00	i 113934 17
Since Dec. 1, 1870	2300321 19	1714329 03	i 585992 10
Total to date	2488089 16	1788162 09	i 699927 07

SHIPPED BY CANAL.

	Total for Week.	Corresponding week last Year.	
From Schuylkill Haven	36,804 10	2,699 05	i 34105 05
" Port Clinton	2,322 09	203 04	i 2,119 00
Total Tonnage per Week	39 126 19	2.902 05	i 36224 05
Since Dec. 1, 1870	238,838 10	77.846 15	i 210991 15
Total to date	327 965 00	80,743 00	i 247221 00

Report of Coal Transported over Central R.R. of N. J. (Lehigh and Sus. Div.)

Week ending July 1—Compared with same time last year.

WHERE SHIPPED FROM	WEEK 1871., tons ct	WEEK 1870. tons ct,	YEAR 1871 tons cwt.	YEAR 1870. tons cwt.
Wyoming Region	42097 00	34293 12	473236 18	572318 01
Upper Lehigh Region	2971 19	4205 12	8504 15	65481 16
Beaver Meadow Region		6100 14		47700 10
Hazleton Region	2075 11	12354 00	3898 10	102183 14
Mahanoy Region		94 07		475 04
Trevorton Region	1346 02		2911 13	
Mauch Chunk Region	6367 17	97 14	61929 06	31187 12
Totals	54864 09	57233 19	550481 02	818346 17
Increase				
Decrease	2369 10		267865 15	
DISTRIBUTION.				
Forwarded East of Mch Chunk by Rail	37715 03	22761 03	442922 13	482001 04
Forwarded East of Mch Chunk by Canal	10454 17	27969 12	45000 09	204404 08
Delivered at and above Mauch Chunk	1328 06	847 09	27669 16	20271 00
Delivered to L. & B. R. R. at Plymouth Bridge	4180 17	5207 07	15846 17	96735 09
L. V. R. R. at Packer'n	1185 06	418 18	18851 07	12935 01
Totals	54864 09	57233 19	550481 02	818346 17
Of the above there was transported on acc'nt of L. C. & N. Co.	10384 17	97 14	80218 11	46841 09
W.-B. C. & I. Co.	26841 15	17567 18	364073 02	251007 14
Totals.	37226 12	17665 12	444291 13	297849 03
Increase	19561 00		146442 10	
Decrease				

Shamokin Coal Trade.

For week ending July 1, 1871	14,097 08
Same time last year	9,092 06
Increase	5,005 02
Decrease	
Total amount shipped to date	308,290 09
Same time last year	164,713 00
Increase	143,487 06
Decrease	

Delaware and Hudson Canal Company.

Coal mined and forwarded by the Delaware and Hudson Canal Company for the week ending Saturday, July 1, 1871.

	WEEK.	SEASON.
North	56,745 19	294 594 09
South	12,224 10	85 914 06
Total	68,970 09	280,509 06
Corresponding time in 1870:		
North	46 748 17	1,143,187 02
South	12 466 06	218 267 00
Total	59 215 03	1,361,3?4 02
Increase North	9,997 02	d 848,892 12
Decrease South	241 16	d 132 29? 14
Total increase	9 775 06	d 980,?84 16

Lehigh Canal Coal Trade.

Shipped for the week ending June 30, 1871.

	WEEK. Tons. Cwt.	TOTAL. Tons. Cwt.
Total from Mauch Chunk Region,	10277 17	63431 17
" " Beaver Meadow "	563 19	1791 11
" " Mahanoy "	136 02	1907 18
" " Hazleton "	2673 06	3919 06
" " Upper Lehigh "	84 15	84 15
" " Wyoming "	5932 19	34695 19
Total	20316 18	104632 06
Corresponding week last year	27430 01	200988 19
Increase		
Decrease	7113 03	95956 13

Delaware and Hudson Canal Company.

The following is a statement of Coal transported by the Delaware and Hudson Canal Co., for the week ending July 1, 1871.

	WEEK.	SEASON.
By Delaware and Hud. Canal,	16 491 00	218,101 00
By Railroad East,	11,333 00	98,527 00
" West,	3479 00	26,012 00
" South.	12,224 00	85,901 00
TOTAL TONS,	63,477 00	428,841 00
For the same period last year.		
By Delaware and Hudson Canal	49,224 00	647,059 00
By Railroad East,	3,859 00	230,867 00
" West,	393 00	28,599 00
" South,	12,466 00	218,207 00
TOTAL TONS,	65,932 00	1,104,732 00

Delaware, Lackawanna & Western Rail Road Company.

Coal transported on the Delaware, Lackawanna and Western R. R. for week ending July 1, 1871.

	Week. Tons. Cwt.	Year. Tons. Cwt.
Shipped North	20,037 00	101,042 07
Shipped South	47,071 11	241,898 18
Total	67,108 11	342,941 05
For the corresponding time last year:		
Shipped North	17,625 12	335,984 16
Shipped South	35,405 10	895,045 18
Total	53,029 02	1,231,030 14
Increase	14,079 09	
Decrease		888,089 09

Pennsylvania Coal Company.

Shipments of Pittston Coal for the week ending July 1, 1871.

	1871. WEEK.	1871. YEAR.	1870. WEEK.	1870. YEAR.
By Railway	28,457 05	151,700 09	25,063 04	553,794 00
" Canal	500 12	2,522 12	954 18	7,406 09
Total	28,957 17	154,223 01	26,018 02	561,200 09

Decrease 1871, 406,977 8 tons.

Schuylkill Canal.

Report of coal transported over the Schuylkill Canal for the week ending Saturday, July 1, 1871.

	Tons. Cwt.
From Port Carbon	
" Pottsville	
" Schuylkill Haven	36,804 10
" Port Clinton	2,322 00
Total for week	39,126 10
Previously this year	288,838 10
Total	327,965 00
To same time last year	80,749 00

Big Lick Collery Coal Trade.

For week ending June 30, 1871	3,347 14
Same time last year	2,026 09
Increase	1,321 05
Decrease	
Total amount shipped to date	60,848 18
Same time last year	26,725 03
Increase	3,4123 15
Decrease	

Lyken's Valley Collery Coal Trade.

For week ending June 30, 1871	2,139 15
Same time last year,	
Inc ease,	2,139 15
Decrease,	
Total amount shipped to date,	40,436 08
Same time last year,	14,221 14
Increase,	26,214 10

Statement of Coal Transported over Cumberland and Pennsylvania Railroad

During the week ending Saturday July 1, and during the year 1871, compared with the corresponding period of 1870.

WEEK.

	To C & O. Canal Tons. Cwt.	To B. & O. R. R. C. Tons. Cwt	Total. Tons Cwt.
1871	21.164 08	29.644 15	50,829 03
1870	17,219 16	17,751 04	34,971 03
Increase	3,944 12	11,913 11	15,858 03
Decrease			

YEAR.

1871	310,144 00	610,824 16	920,968 16
1870	230,750 09	409,333 03	640,083 12
Increase	79,393 11	201,491 13	280,885 04
Decrease			

Cumberland Branch

WEEK.

	To C. & O. Canal. Tons. Cwt.	To B. & O. R. R. Co Tons Cwt.	Total. Tons. Cwt.
1871	6,080 18	1,601 04	7,682 02
1870	3,467 11	2,340 14	5,808 05
Increase	2,613 07		1,873 17
Decrease		739 10	

YEAR.

1871	89,267 12	37,624 14	126,892 06
1870	46,513 01	49,330 07	95,843 08
Increase	42,754 11		31,048 18
Decrease		11,705 13	

Huntington and Broad Top R. R. Co.

For week ending July 1, 1871	6,856 tons.
Same time last year	7,206 "
Increase	"
Decrease	350
Total amount shipped to date	184,657 "
Same time last year	155,991 "
Increase	28,666 "
Decrease	

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

	AT NEW YORK. July 7. R. A.	W. A.	AT PHILADELPHIA. July 6. R. A.	W. A.
SCHUYLKILL.				
Lump	$— —	$— —	5 50	— — 4 50
Steamer	6 00	— —	— —	— — 4 50
Broken	6 00	— —	— —	— — to 4 75
Egg	6 25 —	— —	— —	— — to 4 75
Stove	6 50 —	— —	— —	— — to 5 00
Chestnut	5 75 —	— —	— —	— — to 4 25
Pea	— —	— —	— —	— —
LEHIGH.				
Lump, (along side)	6 75	— —	— —	— —
Broken	6 10	— —	— —	— —
Egg	6 00	— —	— —	— —
Stove	6 50	— —	— —	— —
Chestnut	5 50	— —	— —	— —
Pea	— —	— —	— —	— —
SPECIAL COALS.*				
Diamond Vein	R. A. 5 50@7 00		— —	— —
New England	"	—	— —	— —
Locust Mountain	W. A.	6 50	— —	— —
Honey Brook, Le'h	W. A.	5 00@6 25	— —	— —
Spring Mountain	"	5 00@6 25	— —	— —
Sugar Creek	"	5 00@6 25	— —	— —
Sugar Loaf	"	5 00@6 25	— —	— —
Old Comp'y's	"	5 00@6 25	— —	— —
Cross Creek	"	5 00@6 25	— —	— —
Room Run	"	5 00@6 25	— —	— —
Girardville	"	—	— —	— —
McMichael	"	—	— —	— —
Shamokin	"	5 25	— —	— —
Lykens Valley	"	5 75	— —	— —
Broad Top	"	5 25	— —	— —
Hill & Harris	"	5 25	— —	— —
Henry Clay	"	— —	— —	— —
Powelton	"	5 25	— —	— —

*Dealers in these coals may be found in our advertising columns.

Company Coals.

July, 1871.

	L.	Str.	Gra.	Eg.	Sto.	Ches.
Scranton E. Port	4 70	4 80	5 10	5 50	5 75	4 75
*Pittston at Newburgh	4 50	4 50	4 70	4 80	5 00	4 30
*Lackawana at Rond't	— —	— —	— —	— —	— —	— —
Wilk'b're at Hoboken	4 75	4 75	5 00	5 25	5 75	4 75
Old Co. Lehigh at Pt John's	6 25	— —	5 65	5 50	6 00	5 00
Lehigh at Eliz. Port	6 25	— —	5 65	5 50	6 00	5 00

For freights to different points see "Freights."
* To contractors.

Line Prices for Coal July, 1871,

	Lump	Broken	Egg	Stove	Ches't
At Mauch Chunk	4.50	4.00	4 00	4.25	3.50
" Wilkesbarre,	3 75	3.75	3.75	4.00	3.25

Prices at Baltimore—July, 1871.

Wholesale Prices to Trade.

Wilkesbarre, by cargo or car load	$5 25@5 50
Pittston and Plymouth, do	5 25@5 40
Shamokin Red or White Ash, do	5 25@5 40
Lykens Valley Red Ash, do	— —@5 80
Zerba Valley	— —@— —
Treverton	— —@— —
By retail, all kinds per ton of 2240 lbs.	7 00@7 50
Georges Creek & Cumberland f. o. b. at Locust Point for cargoes	— —@4 75
Fairmont and Clarksburg gas, f. c. b. at L. Point	6 00@6 50
BITUMINOUS COALS.	
Kittaning Coal Co.'s Phœnix Vein..f.o.b. at Phila	$ —
Lemon " " "	—
Cumberland Vein Coal	—
Consolidation Coal Co.'s on board N. Y.	6 75
Maryland Coal Co. " "	6 75

Prices at Georget'n, D.C., & Alexandria, Va.

July, 1871.

George's Creek and Cumberland f. o. b. for shipping...$4 50@4 60.

Prices at Havre de Grace, Md.

Wilkesbarre and other White Ash for cargoes	$5 50@5 75
Lykens Valley	6 00@6 25
Shamokin Red or White Ash	5 50@6 00
Trevorton and Zerba Valley	— —@— —

Prices of Gas Coals.

July, 1871.

PROVINCIAL.

Corrected weekly by Louis J. Beltoni, Jr., 41-43 Pine st., N.Y
Duty, $1 25, gold

	Coarse	Slack.
Block House	$1 75	@-1 75
Gowrie	1 75	@-1 75

Corrected by Bird, Perkins & Job, 86 South street.

	Course.	Culm of Coal.
Pictou	$2 25	@1 25
Sydney	2 25	@- 80
Lingan	1 60	@- 80
Little Glace Bay	1 60	@1 00
Caledonia	1 60	@- 80

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty $1 25 per ton, gold, on the coarse coal. 25 per cent. ad valorem on the Culm of Coal.

AMERICAN.

	Currency.
Westmoreland	7 10 @7 25
Fairmount Gas Coal Co. of N. Y.	7 50 @- —
Despard Coal Co	$7 50 @- —
Penn	7 75 @8 00
Newburg Orrel Gas	— — @- —
West Fairmount Gas Coal	8 00 @- —
AT PHILADELPHIA.	
Powelton	$7 75
TO NEW YORK.	
Provincial.	
Sidney	$ —
Lingan	—
Cow Bay	—
Port Caledonia	—
Little Glace Bay	—
TO BOSTON.	
Sydney	$ —
Lingan	—
Cow Bay	—
Port Caledonia	—
Little Glace Bay	—

Prices of Foreign Coals.

June, 1871.
Duty $1 25 per ton.

Corrected weekly by PARMELE BROS., No 32 Pine street, N. Y.

Liverpool Gas Coking	$ 9 00@— —
" " Cannel	11 50@12 50
" House "	— —@16 00
" Orrel	12 00@14 00
Per ton 2,240 lbs., ex-ship.	
PRICES FROM YARD.	
Liverpool House Orrel, screened	$16 00@17 50
" Cannel, "	18 00@20 00
Per ton 2,000 lbs. delivered.	

Foreign and Provincial Freights.

June, 1871.

Foreign.	
Newcastle and Ports on Tyne, per keel of 21 1-5 tons	£14 00@£16 00
Liverpool, 5 per cent primage	13s @15 ton.

Freights.—June, 1871.

TO EASTERN PORTS.	Cumberland. From Georgetown.	Cumberland. From Baltimore.	Anthracite. From Philadel'a.	Anthracite. From East Port, Port Johnson, and Hoboken.	Anthracite. From Newburg	Anthracite. From Rondout
Amesbury			$2 50	$1 75		
Bangor	$2 75		2 30	1 50		
Bath	2 75	2 75	2 30	1 75		
Boston	2 60	2 50	2 25	1 50	180	1 80
Bridgeport	2 25	2 25	1 80	1 00	1 10	1 25
Bristol		2 60	2 00	1 25		1 55
Cambridgeport			2 75	1 75		
Derby			2 00	1 20		
Dighton	2 30	2 35	2 30	— —		
East Cambridge			2 35	1 75		
Fall River	2 25	2 25	2 25	1 25	1 40	
Hackensack			1 75	1 00		
Hartford	2 75		2 30	1 60		
Jersey City		2 00	1 40	50	1 70	
Middletown			2 25	1 30		
Mystic			— —	1 30		
New Bedford	2 50	2 35	2 00	1 25		
Newburyport	2 75		2 40	1 60		1 35
New Haven	2 25	2 25	1 90	1 00	1 10	2 20
New London	2 25	2 25	1 76	1 10		1 25
Newport			2 00	1 30		1 40
New York	2 00	2 00	1 35	50	70	65
Norwalk			1 80	1 00	1 10	
Norwich	2 25	2 25	2 00	1 20	1 40	
Pawtucket	2 50	2 40	2 30	1 40		1 50
Portland	2 50	2 60	2 30	1 50		1 65
Portsmouth, N. H	2 75	2 75	1 45	1 60		2 00
Providence	2 25	2 25	2 00	1 40	1 50	1 50
Rockport			2 10	1 65		
Saco	2 75		2 25	1 75		
Sag Harbor			1 70	1 20		
Salem	2 60	2 75	2 35	1 50		
Stamford			2 00	1 00	1 10	
Stonington			2 00	1 25	1 20	1 40
Taunton			2 30	1 60		
Warren			— —	1 30		2
Washington			1 25			
TO RIVER PORTS.						
Albany		80			55	
Catskill		70			50	
Cocksackie		70			50	
Coeyman's		70			65	
Cold Spring	2 20	70			30	
Fishkill		70	1 60		30	
Haverstraw					60	
Hudson	2 20	2 25			40	
New York					60	
Nyack			1 75		30	
Poughkeepsie					30	
Rhinebeck						
Rondout					75	
Saugerties			1 60		40	
Sing Sing					75	
Stuyvesant					75	
Tarrytown					75	
Troy					55	
West Point			1 75			
Yonkers					60	

Rates of Transportation to Tide Water.

BY RAILROAD.

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Schuylkill Haven for consumption	$1 95
For reshipment	1 85

MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Phillipsburgh	$0 84
C. R. R., N. J., Phillipsburgh to Elizabethport	1 25
Shipping expenses at Elizabethport	25
Wharfage	10
Total	$2 44

MAUCH CHUNK TO PORT JOHNSON.

L. V. R. R., or L. & S. R. R. from M. C. to Phillipsb'g	$0 84
C. R. R., of N. J., Phillipsburgh to Pt. Johnson	1 25
Shipping expenses	25
Wharfage	10
Total	$2 44

TO HOBOKEN.

L. V. R. R., Mauch Chunk to Phillipsburgh	$ 84
Morris & Essex R. R. Phillipsburgh to Hoboken	1 45
Shipping expenses	25
Warfage	10
Total	$2 64

TO SOUTH AMBOY.

L. V. R. R.	84
B. & D. R. R.	1 15
Cam. & Am. R. R.	1 15
Shipping Expenses	25
Total	$2 24

PENN HAVEN TO ELIZABETHPORT.

L. V. R R Penn Haven to Phillipsburgh	99
C. RR. of N. J. Phillipsburgh to Elizabethport	125
Shipping expenses	25
Wharfage	10
Total	$ 2 59

BY CANAL.

Via Schuylkill Canal.

TO PHILADELPHIA.

From Schuylkill Haven..Toll..$1.25 Freight.,90c	$2 15
" Port Carbon	
" Port Clinton..... " 1.17 " 8 c	2 02

TO NEW YORK.

From Schuylkill Haven ....Toll..1 25 Freight..$1 90	$3 1

The Rates of Toll on Lump and Steamer Coal will be ten per cent less than the above rates. The charge will be per to

of 2240 lbs. No charge less than Forty Cents per ton will be made for any distance. A drawback of thirty cents is allowed on all coal passing Fairmount Locks used at Philadelphia and vicinity.

Via Lehigh Canal.

TO PHILADELPHIA.

Lehigh Canal	$ 80
Freight and towage	1 10
Total	$1 90

TO NEW YORK.

Lehigh Canal	$ 50
Morris Canal, Freight, Towing	2 11
Total	$2 61

TO JERSEY CITY.

Lehigh Canal	$ 50
Morris Canal, Freight	2 09
For re-shipment	2 59

Via Delaware and Raritan Canal.

TO NEW YORK.

Lehigh Canal	$ 50
Delaware Division Canal	30
Delaware and Raritan Canal	46
Freight	1 05
Towage	20
Total	$2 51

TO NEW BRUNSWICK.

Lehigh Canal	$ 50
Delaware Division Canal	30
Delaware and Raritan Canal	46
Freight	1 05
Total	$2 31

MARKET REVIEW.

FOR THE WEEK ENDING JULY 1ST, 1871.

IRON—The demand for Scotch Pig continues light, but the stock is moderate. A despatch by cable was received yesterday announcing an advance of 1s.@1s. 6d. ₱ ton on the other side, which has caused an increased firmness on the part of holders—the sales are 50 tons Eglinton at $30@31; 50 do. Gartsherrie, $33@34; 100 do Coltness, $34; and 100 do. same, $30.50, gold. There continues quite an active inquiry for American, but as the supply is limited transactions are restricted, and prices have a hardening tendency—$35 was refused for 3000 tons No. 1 season delivery—the sales are 200 tons No. 1, and 300 do. No. 2, on private terms: and 260 tons Gray Forge, at $30, cash. New English Rails continue in demand, and prices have slightly appreciated—2500 tons 56 lb. sold at $56,50@57, gold, closing firm at the latter figure. American are quiet but steady at $70@72 currency at the works in Pennsylvania. Refined Bar is nominally steady at our quotations—demand very light. A parcel of 500 bdls. Charcoal Sheet (22@27) sold at 5¾c., cash.

LEAD.—Pig remains quite dull, though we make no change in quotations; 75 tons Spanish sold on private terms. Bar is firm at the advance noticed in our last, viz., 9¾c. Sheet and Pipe are steady at 10¼c., and Tin-lined Pipe 15c., all less 10 ₱ cent. to the trade. Block Tin Pipe brings 58c., usual discount to the trade.

COPPER.—All descriptions of manufactured Copper and Yellow Metal are steady at our quoted rates. The demand for Ingot continues, and the advance noted in our last is fully sustained; the sales embrace about 1,000,000 lb. Lake, at 21¾c. for present, and 21¾ @ 22c. for future delivery, the bulk of the purchases being for delivery between August and January.

SPELTER.—Foreign is quiet but firm; 15 tons Silesian sold at 6 cents, gold. Of Domestic we note 20 tons selected Missouri Zinc Co. at 9¼ currency.

STEEL.—The market, as for a long time past, is unchanged, and we have no new feature to notice—as before noticed, imported has the advantage of domestic, in the low grades.

TIN.—At our last writing we left the market for Pig very quiet, with prices inclined to give way. Since then very favorable telegrams have been received from London and Singapore, the price of Straits in London yesterday being £132, and of English, L. & F., £134; from Singapore the quotation comes $32 50 ₱ picul. Consequent upon these advices an active demand set in, and the purchases of Straits here, and to arrive here and at Boston have been large, embracing over 10,000 slabs, commencing at 33 cents and closing at 33¼. English and Banca have also moved more freely in sympathy with Straits, and sales have been made of 30 tons of the former at 33¼ @33¾c., and 350 slabs Banca 38½@39. Stocks, on the spot and to arrive, are concentrated, and the market closes strong at 34c. asked for Straits, 33¾ for English, and 40 for Banca, the latter in very small supply, all gold. Plates have also been quite active, and prices, with favorable English advices, remain firm, rather favoring sellers. Coke Tin are still in small supply, and Charcoal Terne remain very scarce; sales have been made of 1400 bxs. Charcoal Tin, good brands, at $8.75; 800 do. I. C. Coke Tin, 10 by 14, $7.87½@8; 1350 do. Charcoal Terne, $8.12½@8.25; 500 do. to arrive, $8.12½, all gold; and 1000 do. Charcoal Tin, "Britton," on terms not made public.

ZINC.—Sheet is steady, firm, and in good demand at 7¾ @7¾c. net gold, from dealers' hands, and 7¾ less 4 ₱ ct. from agents' hands to arrive. The sale of Mosselmann from agents' hands, reported in our last, was 100 casks, not 10 as misprinted. Manganese, 4@4½.

METALS.

NEW YORK, July 1, 1871.

IRON.—Duty: Bars, 1 to 1¼ cents ₱ lb; Railroad, 70 cents ₱ 100 lbs.; Boiler and Plate, 1¼ cents ₱ lb; Sheet, Band, Hoop, and Scroll, 1¾ to 1¾ cents ₱ lb; Pig, $7 ₱ ton; Polished Sheet, 3 cts. ₱ lb; Galvanized 2½; Scrap Cast, $6; Wrought, $8 per ton.

	Store Prices.
Pig, Scotch No. 1, ₱ ton	31 00@34 00
Pig, American, No. 1	35 00@— —
Pig, American, No. 2	32 00@35 00
Pig, American, Forge	31 00@32 00
Bar Refined, English and American	72 00@73 00
Bra Swedes, assorted sizes (gold)	85 00@100 00
	Store Prices, Cash.
Bar, Swedes, ord'y sizes,	102 00@115 00
Bar, Refined, ord'y sizes	75 00@— —
Bar, Refined, ¼ @ 5-16 inch	82 50@— —
Bar, Common	70 00@ 72 50
Scroll	95 00@125 00
Ovals and half-round	95 00@120 00
Band	90 00@ 95 —
Horse Shoe	95 00@100 00
Rods, ¼ to 3-16 inch	82 50@12 —
Hoop	100 00@140 00
Nail rod	— —@6¾ —
Sheet, Russia, as to assortment (gold)	12 @12¼
Sheet, Single, D. and T. Common	—4¼@— 5¾
Sheet, Galv'd, Nos. 14 to 26	12@14 and 30 ₱ ct. dis.
" " Nos. 27, 28, and 29	15@18 and 30 ₱ ct. dis.
Rails, English (gold), ₱ ton	55 00 @57 00
Rails, American, at Works in Pa.	70 00 @72 00

STEEL.—Duty: Bars and ingots, valued at 7 cents ₱ lb or under, 2¼ cents; over 7 cents and not above 11, 3 cents ₱ lb; over 11 cents, 3½ cents ₱ lb. and 10 ₱ cent ad val. (Store prices.)

English Cast (2d and 1st quality) ₱ lb	— 15 @— 18
English Spring (2d and 1st quality)	— 7 @— 10
English Blister (2d and 1st quality)	— 10 @— 17
English Machinery	— 11½@— 14
English German (2d and 1st quality)	— 12 @— 14
American Blister "Black Diamond"	— — @— 12
American, Cast, Tool do.	— 15 @— 16
American, Spring, do.	— 9 @— 11
American Machinery, do.	— 10 @— 11
American German, do.	— 9 @— 11

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper 4 cents ₱ lb; Manufactured, 45 per cent. ad val.

	All Cash.
Copper, New Sheathing, ₱ lb	— @— 30
Copper Bolts	— @— 32
Copper Braziers, 16oz. and over	— @— 32
Copper Nails	36 @— 38
Copper, Old Sheathing, &c. mixed lots	— @— 19
Copper, old, for chemical purposes, 14@16 oz.	20 @— 21
Copper, American Ingot	21¼@— 21¾
Yellow Metal, New Sheathing & Bronze	— @— 22
Yellow Metal Bolts	24 @— —
Yellow Metal Nails	— @— 22

LEAD.—Duty: Pig, $2 ₱ 100 lbs.; old Lead, 1½ cents ₱ lb; Pipe and Sheet, 2¼ cents ₱ lb.

Galena, ₱ 100 lbs	$— — @— —
Spanish (gold)	6 12½@6 15
German, do.	6 12½@6 15
English, do.	6 15 @6 50
Bar (net)	8 75 @9 00
Pipe (net)	— — @9 25
Sheet	— — @10 25

Colwell, Shaw & Willard Tin-Lined Lead Pipe 15 cts. ₱ lb.

SPELTER—Duty: In Pigs, Bars & Plates, $1.50 p. 100 lb

Plates, Foreign (gold)	p. 100 lb. 5 87½@ 6 25
Plates, Domestic	p. lb. — 7 @— 11

TIN.—Duty: Pig, Bars, and Blocks, 15 ₱ cent. ad val.; Plate and Sheets and Terne Plates, 25 ₱ cent.; Roofing 25. ad val.

	Gold ₱ lb.
Banca	39 @40
Straits	33¾@34
English	34¼@33¾

PLATES. *Fair to Good Brands.*	*Gold.*	*Currency.*
I. C. Charcoal, ₱ box	$8 62½@8 75	$10 00 @10 50
I. C. Coke	7 50 @8 00	8 75 @ 9 50
Coke Terne	6 25 @7 50	7 25 @ 8 00
Charcoal Terne	8 00 @8 50	9 25 @ 10 00

ZINC—Duty: Pig or Block, $1 50 ₱ 100 lb.; Sheet, 2½ cts. ₱ lb.

Sheet, No. 9 to 11 Foreign ₱ lb. — 8¼@—9¼

Mining Stocks.

NEW YORK, July 6, 1871.

Operations in mining stocks are at a stand-still. No sales are reported. The following table of quotations for this A. M. is furnished us by the Mining Stock Board. In miscellaneous stocks Walkill Assent "Lead" is quoted at 2.

GOLD STOCKS.

	BID.	ASKED.
American Flag	15	25
Bates & Baxter	20	—
Benton	—	10
Black Hawk	25	39
Central Gold	7	10
Cons Gregory	40	50
Grass Valley	10	—
Gunnell	17	—
Holman	—	—
La Crosse	22	25
Liberty	—	—
Mariposa prf.	—	—
Montana	—	—
Rocky Mount	4	5
Quartz Hill	—	35
Smith & Parmlee	30	45
N. Y. & Eldorado	—	—

There is not much change to note in Potroleum stocks if we may except Central and Rynd Farm, which have slightly advanced. Below are the quotations of the Board in full. No sales are reported.

PETROLEUM STOCKS.

	BID.	ASKED.
Bergen Coal and Oil	15	—
Bennehoff Run	20	—
Blood Farm	—	50
Brevoort	33	—
Bliven Oil	20	—
Buchanan Farm	40	—
Central	68	69
Clinton	—	—
Home	—	—
Phillips Pet	—	—
Rynd Farm	35	40
United Petroleum Farms	30	35
United States	—	—
National	—	—
New York & Allegheny	—	—
Northern Light	30	—
Pithole Creek	—	—
Rathbone Oil	24	—
Second National	—	—
Sherman & B	—	—
Tarr Farm	—	—
Hoffman	—	—

San Francisco Stock Market.

"By Telegraph."

Our latest report from the San Francisco Mining Stock Board is dated July 1st. With the exception of Chollar-Potosi, which has slightly advanced, all stocks on the list are decidedly weaker. Belcher has declined $68½, and Gould & Curry $28 per share since our last report. Sales of Amador were effected at $300. Below is the full report of the Board:

Savage	44
Yellow Jacket	72
Kentuck	130½
Chollar Potosi	51
Gould & Curry	93
Belcher	171½
Imperial	40
Amador	300
Crown Point	300
Hale & Norcross	—

Weekly Slate Trade Report—Hydeville.

ROOFING SLATE.

Week ending July 1, 1871.

NAME OF COMPANY.	WEEK.	PREVIOUSLY.	TOTAL FOR YEAR.
Eagle Slate Co	105	2718	2823
Western Vermont Slate Co.	....	306	306
Blue Slate Co	80	1350	1430
The Evergreen Slate Co	90	2333	2423
Forest Mining Slate Co	70	339	409
West Castleton Slate Co	....	....	....
E. D. Billings		614	614
R. M. Copeland	....	404	404

VERMONT SLATE TRADE.

REPORT of Slate Shipped from Middle Granville, N. Y., via the R. & S. R. R., for the week ending July 1 and for the year 1871.

ROOFING SLATE.

NO. OF SQUARES.	Week.	Prev'ly.	Year.
†Penrhyn Slate Co	360	2121	2481
New York, *and Middle Granville Slate Co.	275	2385	2660
†American Slate Co	....	....	....
Benj. Williams	....	785	785
Jones & Williams	....	90	90
Eagle Slate Co	....	205	205
Mettowee Slate Co	105	350	455
Albany Slate Co	....	375	375
H. W. Hughes	....	30	30
Total	....	....	....

MILL STOCK, MANTLES, &c.

NO. OF CASES SHIPPED BY	Week.	Prev'ly.	Total.
Eagle Slate Co	....	....	....
Penrhyn Slate Co	155	2303	2458

BLACK BOARDS.

NO. OF CASES.	Week.	Prev'ly.	Total.
Eagle Slate Co	....	....	....
Penrhyn Slate Co	....	....	....

MILL STOCK, &C.

NO. OF CAS SHIPPED BY,	WEEK.	PREV'Y.	YEAR.
Eagle Slate Co	....	17	17
Penrhyn Slate Co	....	....	....

* Sales made together this season.
† Consolidated Sales.

The Restoration of Burnt Cast Steel.

IT is said on good authority that burnt cast steel may be restored to nearly its original condition by dipping the piece when red hot into a mixture of three parts of melted rosin and two of good boiled linseed oil. The tempering is done by heating the piece to a dull red heat and plunging it into rain water.

DEPARTMENT OF PUBLIC WORKS, NO. 237 BROADWAY.—CHANGE OF GRADE.

Public notice is hereby given that propositions for the following improvements are pending before the Board of Aldermen and Assistant Alderman, viz.:

To change the grade of Fifty-fifth street, from the Eleventh avenue to the New Boulevard line on the North River.

Maps showing the proposed change of grade can be seen at this Department, Room 14.

All persons interested in the foregoing mentioned change of grade, and having objections thereto, are requested to present the same, in writing, to the undersigned, at this Department, on or before the 13th day of July proximo.

Dated, New York, June 30, 1871. WILLIAM M. TWEED,
Commissioner of Public Works.

MICROSCOPES FOR SCIENTIFIC INVESTIGATIONS and Educational Purposes. Price list sent free. T. H. McALLISTER, Optician, 49 Nassau street, N. Y.
c21-6m

Protection Against Quicksilver Fumes.

EXPERIENCE has taught that, to prevent the dangerous influences of quicksilver fumes upon the health of the workmen, in establishments where quicksilver is extensively used—as, for instance, in looking-glass factories—the ordinary means are not sufficient. These means consist in keeping the windows open, providing a good ventilation generally, not having a fire in the shop, and not taking any meals in the same. Further precautions are: frequent rinsing of the mouth and rubbing the gums with charcoal dust, taking baths of warm water, steam or sulphur, frequent changing of the workmen and their work, wearing overalls which remain in the establishment, etc. It was, therefore, of great importance to prove the correctness of Mr. BOUSSINGAULT'S observation, that sulphur fumes are capable of preventing mercurial poisoning. Experiments had previously shown that this agent protects plants against destruction by quicksilver fumes. Dr. PAPPENHEIM, in Arnsberg, has devoted special attention to this matter. He confirms the statement that leaves of plants, standing in a closed room which contains quicksilver, are destroyed in a short time by the latter, which volatilizes already at common temperatures. At the higher degrees of ordinary temperature, green leaves show, in consequence of the decomposition of the chlorophyllum, after a few hours, gray spots, which grow in size and number, dry up the leaf and cause its rapid death. This great susceptibility of the living chlorophyllum towards quicksilver fumes furnishes an excellent test for the presence of quicksilver in the atmosphere of manufacturing establishments. Precaution against possible deception should, however, be taken, as changes of temperature, light, etc., even without the presence of mercury, may cause the dying of leaves. It is, therefore, necessary to distribute a considerable number of plants in places under varied conditions of light, etc.

This method of proving the presence of quicksilver by young, green plants, is more delicate than the gray or brown discoloration of sulphur by mercurial vapors, and in a still higher degree more sensitive than the reaction upon gold or blank copper, since it requires a ponderable quantity of quicksilver to whiten either of these metals. In order to render innoxious the poison thus detected, it is recommended to place near the plants a surface of sufficient extent, covered with flour of sulphur, or to strew the leaves of the plants themselves with this substance. On the surface of the sulphur, and likewise in the atmosphere of the room, in which the sulphur becomes diffused by evaporation even at ordinary temperatures, there forms at once a combination of sulphur and mercury, which is not destructive to the plants, and therefore harmless to human beings. The articles manufactured, as for instance mirrors, in the neighborhood of the sulphur, are not injuriously affected by this process at ordinary temperatures.

Ocean Telegraphs.

FROM a letter recently addressed to Prof. MORSE by CYRUS W. FIELD, Esq., we glean the following interesting facts concerning the Atlantic Cables, and long ocean cables generally. The first cable was successfully laid on the 5th of August, 1858, and ceased to work on the 1st of September of the same year, during which time there were transmitted over it exactly 400 messages. The second cable was laid on July 28, 1866; the third was lost on the 2d of August, 1865, when about two-thirds laid, and recovered on the 2d of September, 1866, and completed on the 8th of the same month. The fourth (French) cable was completed on the 23d of July, 1869. During the month of March, 1871, there were transmitted across the Atlantic 12,547 messages, or on an average about 405 per day; about seven per cent. of these were for the press and paid but half rates. The companies during the past year paid from seven to nine per cent. dividends, but set aside no reserve fund for repairs or renewals.

The Tehuantepec Ship Canal.

THE following is the substance of a letter of Mr. E. A. FUERTES, Chief-Engineer of the expedition sent out last fall to survey the Isthmus of Tehuantepec for a practicable route for a ship canal. The reports which had already been made public differed too much in their results to afford a proper basis for judgment in the matter, and hence Mr. FUERTES' party was sent out. Capt. R. W. SHUFELDT commanded the expedition.

"The only exploration of the Isthmus worth mentioning, as having in view special reference to a canal, was made by the Italian engineer, SIG. MORO. He advocated the junction of the Ostuta and Chicapa Rivers for supplying the summit level with water. This project is impossible, since the Ostuta is lower than the Chicapa; the ridge which separates them is not far from 3,000 feet high; and if these rivers were at suitable hights, the proposed feeder would require a long tunnel, and 20 or 24 miles of very deep cutting.

"SIG. MORO, though a very eminent man, whose honesty and ability I have often admired through his works, mistook the valley of a mountain brook for that of the Chicapa River.

"It is true that Moro inspected the River Corte at Santa Maria; but he abandoned further investigations, owing to the unfavorable reports of Captain ROBLES, who was deceived by Indian narrative, and who, not passing further than the town of Santa Maria, imperfectly surveyed the River Corte, as he drifted on a raft, and in unpropitious weather.

"The only other instance on record of a similar study for the utilization of the Corte for a summit supply, is that of Col. ORBEGOZA, and Dr. DIEGO ORTIZ, who, in 1824, explored the Isthmus, 'for the promotion of Colonization, and the development of Agriculture.' The scheme of a summit supply from the Corte was thought impracticable, on account of 'insuperable difficulties,' which were neither studied nor exposed.

"In the report of the *explorations* from which I quote, it was admitted by its author, that the explorations were 'rapid, defective,' and 'placed under unfavorable circumstances,' since 'they were in want of many necessary things.'

"The only other scheme for a summit supply, which appeared at all feasible, was proposed by the Chief Engineer of the Tehuantepec R. R. Company in his report of September 10, 1870, without mentioning the Corte for supplying the divide. His route, contemplating the collection of water from small streams, was found by us impracticable.

"During more than six weeks a handful of determined men from our expedition braved many hardships and dangers, passing through a difficult country, and suffering greatly on account of the systematic opposition, offered by the Chimalapa Indians. These men discovered a spot never before visited by a human being; found the long expected, *and only possible* solution of this important undertaking, and have thus demonstrated the practicability of a ship canal across the Isthmus of Tehuantepec.

"I offer you this proof of the originality of their survey, because it is justice due to their courage that no one should snatch away from them the glory of their success, which they have conquered with intelligence and at the risk of their health and lives.

"I do not wish to be understood as thinking lightly of the efforts of the previous explorers of this Isthmus. We have found an *invaluable* help in the works associated with the names of BERNARD, MURPHY, WILLIAMS, and others whose surveys were circumscribed to railways.

"No estimate whatever has been made as to the cost of the canal; and our data cannot furnish an answer to this important question, except by comparison, a sort of rational guessing. No estimate has been made as yet with regard to the number of locks required to reach the summit; because the determination of its true height was the last work performed on the Isthmus; and the elevation of the summit reach of the canal depends, in this case, upon the shape of the profiles, which are now being prepared. It is, however, safe to say that seventy locks will be required to descend to the Pacific, and a lesser number to reach the Atlantic terminus of the canal.

"Very truly yours, E. A. FUERTES, C. E., Chief-Engineer, Tehuantepec and Nicaragua Expedition."

Stamford, Conn., June 26, 1871.

Webster's Unabridged.

THE present edition of the great Dictionary leaves nothing to be desired. The volume is as large as any book can reasonably be, and it contains all that can be crowded into the given space. In definitions, WEBSTER was always pre-eminent; in derivations, the former editions were open to criticism, but this one represents the ripest scholarship of Yale. In fact, an inspection of the lists of editors and contributors leads us to say that this edition of WEBSTER'S Dictionary is virtually the offspring of Yale College. No nobler monument of learning and public spirit could be devised. The Dictionary is the worthy fruit of the University.

Whoever habitually keeps this volume at hand will bear witness how often, and with what profit, it is consulted. Not merely the spelling or meaning of a word, but frequently also some single fact in chemistry, mechanics, geography, or even history, which the memory has treacherously let go, may be recovered by means of the brief hint afforded in these pages. Foreign phrases and quotations; literary allusions; classical and modern names; technical terms in the arts—all these and many other treasuries of useful knowledge are here gathered and arranged.

If all our contributors had copies of WEBSTER'S Dictionary, and obeyed its wise suggestions and strict commands, we should be spared much distasteful labor, known euphemistically as "preparing manuscript," but consisting really in the correction of the blunders which eminent men are accustomed to commit in spelling, punctuation, and the choice of words.

Manufacture of Knives.

FEW people have any idea through what a number of hands their pock t knives have passed in the process of manufacture. A bar of steel destined to furnish a number of blades is heated to redness. A length is cut off, and the forger speedily "moods" this, that is, shapes it roughly into the form of a pocket knife blade. Another heating is then required to fit the end for being fashioned into the tang, and yet another before it can undergo the further operation of "smithing," the last stage of which is the stamping of the mark of the thumb nail to facilitate opening. The tang is then ground and the blade marked with the name of the firm. The slight bulge on the reverse side caused by this operation is removed by fire or the grindstone. The blade is then hardened by heating it to redness and then plunging it into water up to the tang. The tempering process follows next, the bluish yellow tint being considered as indicating that the proper degree of heat at which to immerse the blade once more in cold water has been attained. After this the various kinds of blades are classified in the warehouse, and undergo sundry grinding operations to fit them for being hafted Twelve distinct processes have by this time been gone through, and many more are necessary before the knife is completely finished, although the number of hands which it has now to pass through depends in a great measure on the finish to be given to the handle, according to the quality of the blades with which it is fitted, and the price which the completed article is intended to realize.

Meerschaum.

LARGE deposits of meerschaum are reported to have been found in Patagonia. The principal sources of supply at present are Greece, Turkey, Asia Minor and Spain. The mineral is a hydrous silicate of magnesia, very porous, light and soft.

THE ENGINEERING AND MINING JOURNAL.

ROSSITER W. RAYMOND, Ph. D.,
WILLARD P. WARD, M. E.,
Editors.

PUBLISHERS' ANNOUNCEMENT.

THE ENGINEERING AND MINING JOURNAL *is projected in the intent of furthering the best interests of the Engineering and Mining public, by giving wide circulation to original special contributions from the pens of the ablest men in the professions. The careful illustration of new machinery and engineering structures, together with a summary of mining news and market reports, will form a prominent feature of the publication.*

SUBSCRIPTION—*$4 per annum in advance; $2 25 for 6 Months.*

ADVERTISEMENTS.—*The rates are as follows: Inside pages, 25 cents per line each insertion; the outside or last page, 40 cents per line. Payment required in advance.*

NEWS-DEALERS *will be supplied through the agency of the* AMERICAN NEWS COMPANY, *No. 121 Nassau street, New York City.*

COMMUNICATIONS *of all kinds should be addressed to the Manager. The safest method of transmitting moneys is by checks, or Post-office orders, made payable to the order of* WILLARD P. WARD.

Correspondence and general communications of a character suited to the objects of THE ENGINEERING AND MINING JOURNAL *will always be welcome.*

The Postage on THE ENGINEERING AND MINING JOURNAL *is twenty cents a year, payable quarterly, in advance, at the office where received.*

THE SCIENTIFIC PUBLISHING COMPANY,
WILLARD P. WARD, MANAGER,
37 PARK ROW,
P. O. BOX 4404. NEW YORK CITY.

CONTENTS FOR THIS WEEK.

The Viaduct Railroad	17
Cleveland Iron Works	17
German Torpedoes	17
The Actual Horse-power of Steam-engines and Boilers	17
American Iron Metallurgy Viewed from a German Stand-Point	18
The use of Pulverized Fuel	19
The Oil Bearing Limestone of Chicago	20
Review of the Markets	21–22
Slate Trade	23
The Restoration of Burnt Cast-Steel	23
Protection against Quicksilver Fumes	24
Ocean Telegraphs	24
The Tehuantepec Ship Canal	24
Webster's Unabridged	24
Manufacture of Knives	24
Meerschaum	24
Missouri Zinc Manufacture	25
The Purchase of American Mines in England	25
Dolomite as a Building Material	25
The Reconnaissance of the Yukon	25
MINING SUMMARY	26–27
Advertisements	28

Missouri Zinc Manufacture.

THE St. Louis *Journal of Commerce* says that ten zinc furnaces in the southern part of that city are paying $15 per ton for zinc ore, which cannot be mined and delivered on the railroad for less than $10 per ton, and that $5 per ton is only a fair profit on the undertaking. This ore, it claims, yields 40 per cent. of zinc in the furnace, and hence a ton of ore would yield 800 lbs. of metal. At 6¼ cents gold per pound this would give the handsome profit of $35 per ton of ore purchased, provided the smelting cost nothing. They further say, that zinc sells for 9 cents per pound, or $72 per ton, in New York (a curious piece of mathematics), and that the Lehigh Zinc Company can command 11 cents per pound for spelter no better than that produced in Missouri. Finally, it quotes a sale of Missouri zinc in St. Louis at 9 cents per pound, and advises any one who intends to erect works to make his contracts with miners and transportation companies beforehand. In this way he could secure himself, for several years at all events, from extortionate demands from these parties.

These remarks seem to us to deserve some comment at our hands. In the first place, it depends upon what expenses are included in the cost of delivering the ore at the railway, whether the $5 per ton profit is too much for the miner. If it includes general superintendence and all other expenses, we consider it too high. If such items are not included, it is, perhaps, not too much. The statement that the ore yields 40 per cent. of zinc in the furnace is, in our opinion, very doubtful, though we know that the ore is very good. It may possibly *contain* 40 per cent., but unless the owners of the St. Louis smelting works can treat their ores to much better advantage than European establishments have been able to, they must lose a large percentage (at least 25 to 30 per cent.) of the metal contained in the ore. The various prices given for zinc would seem to show that there is but a very dull market for the commodity in St. Louis. This points to an over production, already. In this case it is but natural, that the smelter, unable to make anything with so dull a market, should seek to obtain his ore at lower rates, whereas it is just as natural that the miner with his $5 per ton of ore, or probably nearly $20 per ton of zinc, as profit, should not desire a reduction.

The knowledge of the amount that the smelter pays for the pound of zinc in the ore, and the amount that he receives for the smelted metal, is not sufficient to show what he may either gain or lose on the operation of smelting the ore, unless we know both the actual outlay in money, and the loss of metal incurred in the process, On these points the article in the *Commercial* does not touch, and upon them depends the whole question of equity between the miner and the smelter.

The Purchase of American Mines in England.

FROM our English exchanges we learn that the English capitalists are generally well pleased with their purchases of American mines. Nevada mines seem to be attracting great attention in the London mining market, and the shares of some of the companies, which completed their purchases some time ago, are now worth four or five times the amount paid for them. The Eberhardt and South Aurora mines have been very successful since they came into the hands of their present owners. The stock of the former sells for 400 per cent., and the latter for over 200.

The Great Western Silver Mining Company has just decided to buy a mine on the same mineral belt as the Eberhardt and Aurora South, and will immediately send an agent to this country to complete the purchase and take possession of the property.

Dolomite as a Building Material.

AFTER a thorough examination of the geological and mineralogical properties of this stone and the causes which effect its decomposition, German chemists have concluded that it is not a suitable building material. It is to be deplored that the Roman Catholic Cathedral, on the Fifth avenue, one of the largest and finest buildings in this city, is now being erected of this stone.

The Reconnaissance of the Yukon.

IT is about a year and a half since we copied from the New York *Star* an interesting account of the expedition of Captain C. W. RAYMOND, of the Corps of Engineers, United States Army, up the Yukon river in Alaska. The complete official report of that officer, including astronomical and other records, reductions and computations, and accompanied with an original map, illustrative of the same, was transmitted to the Chief of Engineers in April last, by him to the Secretary of War, by him to the Senate, by the Senate to the Congressional Printer, and so on, the result of this long catenation of causes being the presence at this moment of a copy of the report upon our table.

If this document had made its appearance two of three years earlier, it would have attracted more general attention than is now likely to be bestowed upon it, since it would have constituted an interesting and authoritative contribution to the discussion which has now nearly died away, concerning the resources and value of the Territory of Alaska. Even Mr. DALL's large volume came too late to reap the full benefit of the public interest in that question, and Captain RAYMOND is of course "distanced." Yet this compact, clear and well-arranged account of a daring and successful reconnaissance upon one of the great rivers of the world, may still be perused with pleasure and profit by the general reader, as well as the professional engineer. As the author remarks, "when the transfer of the territory of A'aska to the United States was consummated, few Americans were aware that we had acquired a river which, rising far in the interior and draining a vast area, flows two thousand miles in its course to the sea." The books of WHYMPER and DALL, and the present report, have furnished us with all that we need to know at present concerning this stream, and will remain for a long time, no doubt, the latest authorities upon the subject, since their accounts are not calculated to excite a desire for further explorations in that quarter. The trip is difficult without being particularly dangerous; the country is not generally picturesque; the inhabitants are uninteresting, even as savages; there are no indications of valuable minerals along the river; the agricultural prospect is *nil*, in spite of some feeble enthusiasm of Mr. DALL, on the subject of stunted turnips raised by careful nursing; the fur-trade is meagre, and, for the most part, hopelessly in the hands of the Hudson Bay Company; and, finally, the only valuable thing which is really abundant—namely, salmon—may be found in equal excellence in rivers farther south. On the whole, it is not likely that this part of our national domain will prove attractive, even to railroad companies applying for land grants.

It is but fair to add, that southern Alaska, including Sitka and the seal-islands, is not so barren and poor as the region of the Yukon, though there is little to be said in praise of even the most favored sections of our expensive purchase; and it has become evident that we bought a dear bargain, unless it may turn out to have been an appropriate preliminary to the acquisition of British Columbia.

Captain RAYMOND's report gives, in five chapters, a narrative of the expedition, a description of the river and adjacent country, an account of the native tribes, a statement of the trade of the Hudson Bay Company, and a discussion of the resources of the region. A second part contains a description of the various astronomical, magnetic, meteorological and hypsometric observations made in the field, the methods employed in their reduction, and the results obtained. A description of the map is included. In the appendices are the tabulated records, reductions, computations, distances, etc. The whole report is completed in 113 octavo pages.

The history of the expedition may be outlined as follows: In the spring of 1869, capitalists in San Francisco proposed to transport a small steamer upon the deck of a sailing-vessel to some point near the mouth of the Yukon, and, launching it, to ascend, if possible, as far as Fort Yukon, trading along the banks. In connection with this enterprise, it was regarded as extremely desirable that the question of English right to trade in this portion of our territory should be definitely settled; and as the region in the vicinity of Fort Yukon was supposed to be peculiarly rich in furs, it was also desired that the position of this post should be officially determined, and, if it was found to be within the territory of the United States, that measures should be taken to cause its abandonment by the English company. For this purpose chiefly, Captain RAYMOND was detailed to conduct the necessary observations, and, incidentally, to execute a reconnaissance of the river, and to collect information concerning the country. His force consisted of one assistant and a private of the Ninth Infantry.

The brig Commodore sailed with the party from San Francisco April 6, 1869; from Sitka May 9; from Ounalaska June 8; and finally arrived at St. Michael's Island, in Norton Sound, on the 29th of June. On the fourth of July the little steamer Yukon, with flags flying and guns firing, started on its voyage. On the 31st of July, it reached Fort Yukon. The steamer remained long enough to get the results of the observations on the solar eclipse, which gave the longitude of Fort Yukon as considerably

within our territory. On the 9th of August, Captain RAYMOND notified the representative of the Hudson Bay Company of this fact, took possession of the buildings, and raised the flag of the United States over the fort. This illustration of the familiar lines, "Peace hath her victories," etc., is almost ludicrous. To besiege a fort with an army of one, bombard it with a telescope, aimed at the sun (to secure a high trajectory, and a vertical fire), and capture it with a summons consisting principally of logarithms, is certainly a triumph of science!

On the 10th of August, the steamer started down the river, the water in which was falling so rapidly (by the freezing of the upper tributaries) as to make haste necessary. Captain RAYMOND and his party remained at the Fort, to continue astronomical observations, until the 27th, when they commenced a laborious and somewhat perilous seaward voyage in a small skiff, constructed of drift-wood. This ricketty craft went to pieces near Anvic, about three hundred miles from the sea, and the party were forced to leave the Yukon, ascend the Anvic river, a northern tributary, and make a desperate march to the coast, where they arrived in the evening of September 23, half dead with fatigue and hunger. Four days after, the Commodore sailed for San Francisco, where she arrived November 6, exactly seven months from the day of departure.

The military conciseness and absence of rhetorical display in the description of this journey are calculated to conceal from the general reader the real hardship and the courage and endurance involved in its execution. We are accustomed to have travellers tell us plainly when they do or suffer great things, and not to hear a march which was little less than a forlorn hope, across mountains, rivers and terrible moss-swamps, without guide or road, and sometimes without food, characterized merely as an "eventful and, in some respects, unpleasant journey."

There are many suggestive bits of information in these laconic pages. Thus DARWIN will be interested to know (unless he knows it already) that the Hudson Bay Company's dogs, at Fort Yukon, are fed (in the summer when they are not worked) but once a week!—a curious illustration of the adaptability of the animal system. As there is positively nothing in the surrounding country which they can eat (even their own tails being—query, bitten?—short off), they must live on their weekly meal alone. It is not surprising that they devoured the moosehide rope of the captain's skiff, causing a weary race down-stream to recover the boat.

Field-astronomers will be interested in the ingenious devices by which imperfections and damages to instruments were repaired, and many unforeseen difficulties of observation overcome. For instance, two of the seven threads had been, *en route*, broken from the reticule of the transit instrument, an injury difficult for any but a skilled workman with appropriate tools to remedy. Captain RAYMOND describes his treatment of the case thus:

"The reticule-frame was fixed in the tube of the transit instrument in such a way that, in the absence of the proper tools, it could not be removed without danger to the remaining threads. Having procured some fresh thread from a spider, I made a little frame of paper, with a handle bent vertically, and fixing the lines to it, lowered them into position, adjusting them with my pocket microscope, and finally securing them in place, by means of a little shellac varnish, with which I was fortunately provided. After a great many trials, I finally succeeded in adjusting them to my satisfaction; and I found afterwards that the intervals were quite as good as those fixed by the instrument-maker."

The magnetic observations were seriously affected by the aurora, which might be expected, Fort Yukon being within the polar circle, to be a frequent phenomenon. Captain RAYMOND says:

"On almost every night during our stay at Fort Yukon brilliant displays of aurora were visible. * * The auroral lights were most brilliant in the northeast or about the magnetic north, and from that quarter traveled in flushes over the sky towards the west and south. They presented the appearance of a series of delicate, transparent, silken curtains of a soft, white color, brilliantly illuminated, and moving through the heavens with a slow, waving motion, with many foldings and unfoldings, as if swayed by gentle breezes. On one occasion they apparently came so near the earth that they seemed almost within the reach of an outstretched hand. Some persons say that during these displays they have heard a low, sighing sound; but this I have never noticed—and I am inclined to consider it an acoustic illusion. So impressive is the effect produced by these phenomena that the very stillness seems to be audible."

We have no space for further quotation or remark, and must content ourselves with adding that the map accompanying this report is the most accurate that has yet appeared of the Yukon river. It is constructed on a polyconic projection, on the scale of one inch to 50,000 feet, and the execution reflects credit on the skill and taste of the draughtsman, and of Mr. JULIUS BIEN of this city, by whom it was lithographed.

MINING SUMMARY.

California.

JULIAN AND BANNER DISTRICT—SAN DIEGO COUNTY.

C. B. HOPKINS writes to the *Scientific Press* from Julian City, May 29th: "The Warlock Co. (GEORGE MCKEAN'S mines), have bought the Trail ledge, which will enable them to keep their mill running constantly on good-paying ore. The three owners in this company are wide awake, energetic men, and will make money fast in this operation. The Chapparal Company have a fine ledge in their shaft of ore, estimated worth $50 per ton. The Antelope boys, of whom I spoke in my last, as being in Francisco buying a mill, returned last month with a 5-stamp mill, engine, boiler, and everything in complete order, manufactured at the Union Foundry. In less than four weeks from its arrival here, it was running, having no trouble in setting it up, it being so perfectly furnished and finished in all its parts, that being the usual style of turning off work by BOOTH & Co. The first run they made, of fifteen tons, turned out a large amount of amalgam. Having used some chemicals, and being inexperienced at the business, everything being new and rough, they amalgamated all the iron, and after retorting, sent it to San Francisco for separation and refining. They afterwards made another run, including refuse ore, that paid $50 per ton, I am told. The Madden Company had twenty-five tons of ore worked in McMechan's mill, which paid $30 per ton. They are now working in a body of ore as rich as was ever seen in the district. I saw a large block of quartz from their mine that was full of gold, and one side literally plastered with it. The Kentuck is as rich as ever, at fifty feet deep. MCMECHAN & REDMAN'S mine have worked about forty tons of ore in the last few days, paying about $60 per ton. In running in their tunnel from the lowest level, they have struck quite a stream of water, and the ore has changed its character very much, showing good silver ore now, with free gold plentifully distributed throughout, and the ledge from five to six feet in width. The Bailey Brothers' claim, which is to the south end of the Redman ledge, shows the same character of ore, and on the 450-foot level (their tunnel running in on their vein) they have a six or eight-foot ledge. They have their ditch completed for their water power, and are saving their ore until they get a turbine wheel and five stamps, to work their own rock. The new discovery, which I called the King ledge in my last letter, but which is now called the Golden Chariot, made a trail to McMechan's mill, and packed twelve 13-20 tons of ore on jackasses, as taken out of their ledge, which returned $181 per ton. The company have let a contract for making a wagon road from the mine to the mill, and will soon let the country hear from them on a more extensive scale. They are down forty feet on their claim, and the rock is as good as ever, and ledges increasing in size. MCMECHAN will soon have Varney pans attached to his mill, and then you will hear of much better results from the ores in this region. The Van West, California, Owens, and Helvetia companies, Julian district, are all looking well.

THE SCHOOLBOY LEDGE—NEVADA COUNTY.

This ledge, situated at Gold Flat, and which was discovered by the school children while at play, some time since, the *Transcript* says, has recently been purchased by MCAUSLAN & Co., who have run a tunnel some two hundred feet, and a few days since struck the ledge, which is about one and a-half feet thick and filled with rich sulphurets and galena. The rock is easily got out by gadding, no powder having to be used. The work of taking out the quartz has now commenced, and soon a crushing will be had. Several old quartz miners have examined specimens from the ledge, and pronounce them equal to any they have seen in the county. From the end of the tunel the owners have eighty feet backs, which will last them for some time.

KEYSTONE GRAVEL MINING COMPANY.

The same paper has the following: This company, consisting of A. C. NILES, NILES SEARLS, GEORGE E. TURNER, A. H. PARKER, JOHN W. HINDS, R. W. TULLY, H. STANSFIELD, B. G. ALLEN, D. FELTON, and J. W. STUMP have purchased some four or five claims on Montezuma Hill, which they have consolidated under the name of the Keystone Mining Company. They have formed an incorporation, making the principal place of business Nevada City. The old Manzanita Hill claims have yielded fortunes, but owing to the want of fall have been worked to disadvantage. The gravel prospects well 200 feet above the bed-rock, and as high as $90 to the pan has been obtained from the gravel. The new company propose to open the channel to the bed-rock by two bed-rock tunnels, one giving outlet into Shady creek, and the other into the Yuba, the Shady creek tunnel to be opened first. It is estimated that this work will cost from $10,000 to $20,000, but as the company have a large area of ground through which they are satisfied the rich channel runs, they will soon get their money back. They expect to be ready to commence washing next March, and they will give employment to a large number of men. The capital stock of the company is $100,000, and the Trustees for the first three months, JOHN W. HINDS, D. FELTON, and A. H. PARKER.

MANHATTAN MINE.

According to the Grass Valley *Union*, of June 25th, the Manhattan mine is in Nevada Township, and is owned by Nevada City and Grass Valley men. A crushing of thirty-seven loads of rock from the Manhattan was lately made. The crushing was at BEN MCCAULEY'S mill, Boston ravine. The proceeds of the crushing was $1260 or about $37 a load. The sulphurets saved are rich, and will put the yield at about $40 a load for the Manhattan rock.

GREEN MINE—PLACER COUNTY.

The Green Mine, located near Auburn, in Placer county, is already famous as a gold producer. A gentleman from Auburn informs the Grass Valley *Union* that a two-weeks' run of the mill of four stamps has resulted in $50,000 in gold. This clean-up is almost unprecedented in the State. The Auburn mines are steadily and strongly proving that the business of mining is the leading one in California.

BIG MONEY.

The Auburn *Stars and Stripes* of Thursday has the following: Yule's claim, above Last Chance, yielded 114 ounces, worth over $2,100 for the six days ending with Friday, June 16th. Weske's claim, at Turkey Hill, above Michigan Bluff, yielded 514½ ounces for the week ending June 17th, for which Stroebel of the Bluff paid him $9,004. This gives YULE & Co. over $4,100 and WESKE over $15,000 of dividends for the three weeks last past, showing a steady and uniform improvement weekly, and we are assured that there are reliable indications of better pay ahead. WESKE'S Superintendent sets his stakes at $12,000 for the ensuing week, and his former predictions have invariably been more than verified.

Colorado.

The following items are from the Cariboo *Post* of June 24th:

WARD DISTRICT.

On the Ni-Wot hill a crowd of busy men repairing old buildings and preparing for new ones, give the appearance of reviving prosperity. Adjoining the mill, buildings one hundred and twenty feet long in all are projected to accommodate the Chlorination Works of Mr. RICHARDSON, excavations for which are now being made. He will use four Bruckner Cylinders at first and add others as the business increases. Mr. W. M. TOBIE will run the stamp-mill for SMITH & DAVIDSON. That wonderful mine, No. 10 west on the Columbian, discloses an eight-foot crevice in the west drift. This and a four-foot crevice on the Benton is thought sufficient to feed forty-five stamps. CARSON, LONG, and others are working the Nelson; MITCHELL, WILLIAMS, MOONEY and MCDONALD the Benton; CRARY, BENSON and others the Columbian. The boys in Ward have a recent habit of going down into the Columbian shafts in which the surface quartz has once been worked out, and running a cross-cut for parallel veins. Some of these side veins are found larger and richer than the one originally worked. In this way thousands of dol-

lars will be obtained this season. The width of the Columbian lode at the surface is not yet determined. The guangue which fills the vast space between the walls yields under stamps, about two ounces of gold per cord. This is easily mined, and may be obtained in such quantities that if all the stamps in Colorado were put at work on it the supply would not soon be exhausted. The iron and copper pyrites contain from three to four ounces of gold per ton, and fifteen to twenty ounces of silver per ton, and this gold is diffused with remarkable evenness through the ore the whole length of the vein. None of the rock which fills the vast space between the walls is entirely destitute of gold. About twenty per cent. of the assay is saved by the stamp mills. The lode has yielded up to this present time not far from a quarter of a million of dollars, and in obtaining this it is probable that not less than three quarters of a million has been run down the creek and lost to the commerce of the world.

GOLD HILL.

H. FULLEN is working a seven-foot crevice on his White Rock lode. The best of his ore—solid mineral iron and copper pyrites—runs fourteen ounces per cord, and it averages so well that he is making a net profit of not less than one hundred dollars per day. How is that for high? And there is no prospect to any let up to this state of things. He is getting an income at the rate of twenty-five thousand a year—a Presidential salary, without half the trouble of a President. He is proposing to put up another stamp-mill with steam power, so as to run next winter.

FOUR-MILE.

Six or seven parties are now working the bed of this creek for gold, and are doing well. Some of the claims worked are well up the creek. It is the opinion of the miners that the coarse or shot-gold obtained is washed down from the head of the creek, which forms on the eastern slope of the bald mountain between this place and Ward. This place (the head of the Four-Mile) is as unknown and unappreciated as Grand Island was two years ago. Without doubt there is a gold area there as yet undiscovered. Rich specimens of gold ore have been brought in from that locality.

Montana.

A correspondent of the Helena Weekly *Herald* has furnished that paper lately with a series of articles on the different mining camps of the Territory. From numbers eight and nine of this series we extract the following:

From Deer Lodge county we pass to Lewis and Clark on MORROW & Co.'s toll road, recrossing America's backbone over the low pass at the head of Cañon Creek. The Crary Company, mining in the Tar Head Gulch, are doing better this season than ever, their ground paying them $14 and over to the hand per day. CHASE & Co., and HYDE & Co., working in another tributary of Cañon Creek, are also doing well. Virginia Creek is worked by Whites and Chinamen to the very summit, paying all wages and over. Georgetown has more water than usual, all used to good advantage. The Rocker Ditch Company now have a good head of water through their ditch, the first for three years. REYNOLDS & SEARS have an inclined tunnel into their bar ground here, and have drifted several hundred feet on bed-rock, finding pay all through. They are soon to set several drifters at work, whim and car for hoisting. ADRIANCE & Co.'s Drain Ditch now lies idle on account of high water; it is the determination of this company to resume work when the water subsides, and drift across from rim to rim; small prospects can be obtained in the drain the last hundred feet, indicating something better below. If pay is found in this drain others will be run in lower Cañon Creek, and Georgetown will continue to be a good point. WM. SANFORD & Co. have purchased the ditches and mining property, consisting of both gulch and bar, at Piegan, and are fixed up in shape to make money. The old Piegan Ditch Company never received much benefit from this valuable property from the fact that they were not practical miners. The gulch is worked by flume and hydraulic, and the bar with ground sluces. Some three or four companies are working further up the gulch.

LITTLE PRICKLY PEAR BASIN.

This basin contains an area about half the size, and is even milder in winter than the Big Prickly Basin. Trinity Gulch is, with one or two exceptions, deserted, but the bar, below what was once the town, is being worked by six or eight companies. MELON & Co. are going to flume through all the old tailing, expecting, from prospects obtained, to make some money by so doing. The best ground seems to have been worked, yet "pay" is left, and in some instances more. From seventy-five to one hundred miners find employment in Silver Creek and Bars. The bar above town pays as well to-day as it did years ago, and ten years more work, with the present supply of water, will not work it out. Silver city presents a better appearance than ever. The Big Prickly Pear mines are now worked and owned entirely by Chinamen, and Montana City contains but half a dozen whites. There is a probability of prospecting the main creek with a drain, below town this fall, and as Chinamen are making good pay in the creek two miles above, hopes are entertained that it will also prove good below, and that Montana City will again be populated by a considerable number of whites. Mr. HALL has several bars of tin, weighing a couple of pounds each, reduced by himself from ore picked from the gravel at the adjacent bar. The ore thus gathered is over 90 per cent. pure tin (chemically pure cassiterite cannot contain more than 78.67 per cent. of tin.—ED.) and a ledge of the same metal is supposed to exist in the vicinity, but is as yet to be found and developed. Opposite the mouth of Clancy creek, near the toll-gate, lies a hundred or more sacks of silver ore, waiting for downward trains to be shipped to Corinne for reduction by Mr. WILSON, and taken from the Legal Tender lode, a few rods only from the main road. Jefferson City presents not a very stirring, but really a pleasant appearance; it supplies mining camps on either side, however, giving to the business men a liberal field of patronage.

THE JEFFERSON SILVER MINES,

situated from two to four miles from Jefferson City, like those of the Flint Creek District, are rich, but not available, as the proper method of reduction is yet to be tried, the several smelters thus far used having proved failures. A company of three men, who have mined some years in the silver regions of Colorado, attracted by the reports of rich silver leads in this section, came here this spring, spent some time in assaying and becoming acquainted with the ores of the various ledges, and are now erecting roasting, reverberatory and cupelling works, in which they assure owners that their ores will be reduced in as good shape as at Corinne or Omaha. I visited only one of the leads, the Alta California, owned by Prof. MARSH & Co. The Professor himself was at the mine, and conducted me "below." This ledge pitches at an angle of 45 degs. into the earth, and has a well-defined crevice, eight feet wide. From the shaft, now eighty or more feet deep, comes the ore which this company are now shipping to Corinne, and on which they are advanced $25 per ton at the mine; with the money received for the ore thus taken out and shipped, the Professor pays the expenses of running a tunnel, now being vigorously prosecuted, to tap the ledge lower than any point now reached, and has a "sinking" fund left. Prof. MARSH seems to be a thorough practical man, and believes in such theories, only, as can be practiced. It is his determination to know exactly the extent and value of their mine, and the kind of machinery required for reducing the ore, before purchasing and constructing works calculated to be permanent. Some of the bar mines near Boulder are paying well this season, yet they are so scattered that not much of the town is seen either at the Big or Little Boulder. On the head of Elk Horn Creek, a tributary to the lower Boulder, a copper and silver ledge is now undergoing the process of a thorough test, through the medium of a smelter just erected.

Nevada.

BULL RUN DISTRICT, ELKO COUNTY.

The correspondent of the *Scientific Press* writes from the above locality on June 5th: We have about 100 miners at work on the various ledges, and many more men are prospecting for new ledges, while two pack-trains are steadily employed carrying ore from here to Mountain City, and bringing back provisions as return-freight. Such large quantities of ore have been shipped from here in this way that we have been notified by Mr. P. F. DAVIS, the proprietor of Vance's mill, that he has more ore on hand than he can crush in six or eight months. His is the only dry-crushing mill at that place, and has to do all the work; for the miners here are not willing to have their ores worked by the wet process. On account of this large accumulation of ores at Mountain City, Mr. Norton proposes erecting roasting furnaces at his 10-stamp mill there, to enable him to work the ores from here; yet, notwithstanding this, there is an increasing demand for a first-class 10 or 20-stamp mill, and a good Stetefeldt furnace. It has been said that Cope and Bull Run districts together cannot give steady employment to the mill already in operation at Mountain City. Allowing even this, for argument's sake, there are still great reasons for believing that a first-class mill would get even more ore than it could crush. The Auburn mill at Reno will buy ore assaying $600 per ton, at 80 per cent. of assay value; also the Manhattan mill at Austin will work high-grade ores up to ninety and ninety-four per cent. of assay value. The best we can do with the mill here is to have our ores worked up to eighty per cent. of assay value, and pay $ 5 per ton for the process, while the other mills will buy the ore out and out for eighty per cent. of the the assay value; thus the difference between a first-class and a second-class mill is at least $30 per ton in favor of the former. Hence it will be seen that if a first-class mill was erected here, the $30, besides $20 more for the freight we pay from here to Mountain City—the small sum of $50 per ton—might be saved us, which would be a nice profit of itself. Yet, notwithstanding all these drawbacks, our claims are still being worked with success. The work going on in our principal mines is as follows: The Blue Jacket is driving a tunnel to drain the main shaft; at the Found Treasure a very rich body of ore has been struck, and hundreds of tons of very high-grade ore are in sight; there is a very rich show of ore at the Monument too; the Johnson Company are sinking an incline on their ledge, and taking out some very good ore; the Nevada Company also are bringing out rich ore from their ledge, which is six feet wide, and gives a good show of mineral all through; the Norwich mine is looking better than ever, it has been worked down forty feet on the ledge, and there is an abundance of ore in sight, which is better than that found at the surface; the Erie Company are also at work on their ledge, which promises well. Many other companies are also at work, and more prospectors are coming in every day.

WHITE PINE COUNTY.

In an article on smelting in White Pine, "Truth-teller" writes from Shermantown on June 12th: A short time since a paragraph was published in the White Pine *News* in relation to the stoppage of the Alsop furnace, to the effect that it appeared that it would not pay to smelt the base ores of this district. As this statement was reprinted in your mining summary of June 3d, I deem it just that you should receive for publication the following facts, consisting of the figures of expenses and receipts of the last run of the said Alsop works, before the shutting down referred to. These figures were mostly obtained at the furnace at the close of the working on that occasion, and may be relied on as mainly correct:

EXPENSES.

20 tons high grade base ore, delivered at the furnace at $22 per ton,	$440 00
9 tons second-class do., at $12 per ton,	108 00
2 tons high grade at $20 per ton,	40 00
71 tons gray carbonate at $11 per ton,	781 00
1,930 bushels charcoal at 25c. per bushel,	485 00
7 men at $4 per day for 10 days,	280 00
6 men at $3.50 per day for 10 days,	210 00
7 dollars per day for wood for boiler, 8½ days,	60 00
10 days horse hire for Superintendent at $4,	40 00
Sundries—oil, steel, hauling clay, etc.,	10 00
8½ days rent of furnace at $200 per month,	50 00
Total,	$2,504 00

The bullion produced from the above amount of ore was 31½ tons, for which the lessees of the furnace received an advance in Hamilton of $90 per ton, making $2,835.

DEDUCTIONS.

Hauling 31½ tons to Hamilton, at $4 per ton,	$ 126 00	
Assay of bullion,	5 00	
Freight of do. to San Francisco at $35 per ton,	1,103 00	
Drayage in San Francisco at $1 per ton,	31 50	
Loss by commissions, dross, etc., at 20 per cent.,	467 00	
Expense account as above,	2,504 00	4,236 50
Apparent loss,		$1,401 50

But the assays for the silver contained in the 31½ tons of bullion showed 48½, 57 and 60 ounces to the ton. We will take the average of those amounts, about 54 ounces, at $1 per ounce, which will foot up:

31½ tons at $54 per ton,	$1,701 00
All deductions made,	1,401 50
Net profits,	$299 50

Three hundred dollars profit on an investment of twenty-five hundred for ten days is about 12 per cent. or 36 per cent. a month. It strikes an impartial observer that any business man not inordinately avaricious ought to be satisfied with profits accumulated so rapidly.

But several of the deductions made are evidently too high. That for dross and commissions is manifestly so by at least one-half. This would make an addition to

the profits of $233. So with the freightage to Hamilton. Then the silver yield may turn out better in the returns than the average sum taken in the above account.

WASHOE.

The Gold Hill *News* of June 24th has the following mining items: The present advance in Yellow Jacket stock is not based upon new development in the mine. Nothing new is found at either of the lower levels. At the 1,100, drifting north and cross-cutting east is going on as usual. The new station is now completed for the incline from the shaft. This station is 40 feet above the 1,100 foot level, and from there the incline leaves the shaft and follows the dip of the ledge east. The incline is already completed to the 1,100 foot level, and progressing downward at a satisfactory rate. The annual meeting of the company takes place July 17th. The Crown Point mine is running six mills at present, and the bullion receipts foot up to $300,000 per month. The ore body widens out toward the Belcher mine, and the face of the drift in that direction shows improved assays. The heavy body of water encountered at the lowest level of the Savage mine is considered a very encouraging indication of a large body of ore in the immediate neighborhood.

The same paper of June 25th says of the new hoisting engine of the Crown Point as follows: An excellent new hoisting engine has just got started into operation at the Crown Point works. It is placed in the south portion of the building, formerly used as the carpenter shop, and is rated at 60 horse power, with an 18 inch cylinder and 27 inch stroke. It is from the Risdon Iron Works, San Francisco, and works splendidly. The steam for this engine is conducted by a large new boiler, 54 inches in diameter by 16 feet long, and containing 54 three-inch tubes. This new engine is designed for hoisting ore through the incline from the 1,200 foot level to the 1,100 foot station, from whence it will be raised to the surface by the other engines.

ESMERALDA COUNTY.

According to a late correspondent of the Inyo *Independent* the formerly flourishing districts, Palmetto and Silver Peak, are now entirely deserted.

New Mexico.

At Grouse gulch, says the Cimarron *News* of June 24th, everything is lively and the miners are in good spirits. Last clean up of TOM IUWIN foots up 32 ounces; PORTER & LYNCH, 22 ounces; Michigan Company, 18 ounces. Messrs. HENDERSON & PRICE have leased Spanish Bar.

Miners on Humbug gulch are doing well. The California Company, with an insufficient supply of water, took out 35 ounces last week. LESPERANCE & Co. have started work on their claim, with good prospects. Aztec mines are paying better than ever. Gold shipped foots up $6,598.

U. S. PATENT OFFICE,
WASHINGTON, D. C., May, 25, 1871.

On the petition of CHARLES H. SAYRE of Utica, New York, praying for the extension of a patent granted to him on the 25th day of August, 1857, for an improvement in Cultivators.

It is ordered that the testimony in the case be closed on the 20th day of July next, that the time for filing arguments and the Examiner's report be limited to the 4th day of August next, and that said petition be heard on the 9th day of August next. Any person may oppose this extension.

M. D. LEGGETT, Commissioner.

STANDARD CLAY RETORTS,

FIRE BRICKS AND TILES,
STOVE LININGS AND FIRE CEMENTS.
Vitrified steam-pressed Drain and Sewer Pipe, and Manufacturers of Clay in general.
Baltimore Retort and Fire-Brick Works.
GEO. C. HICKS & CO,
Ap'd eow 1y Baltimore, Md.

R. P. ROTHWELL,

MINING AND CIVIL ENGINEER

AND METALLURGIST,

From the Imperial School of Mines, Paris, member of the Geological Society of France, etc,

OFFICE, WILKESBARRE, PA.

Having had a large practical experience in Europe and this country, is prepared to examine and report on all kinds of mineral property, superintend mines, and metallurgical works, assay ores, etc. 18-2-qp

---

W. G. ATKINSON,

CIVIL AND MINING ENGINEER,

Charleston, Kanawha county, W. Va., P. O. Box 393.
Attention paid to ENGINEERING SURVEYS, EXPLORATIONS, &c., and to PLANS and CONSTRUCTION of WORKS in the COAL and IRON FIELDS of the SOUTHERN and WESTERN STATES.

REFERENCES—Gen. Geo. S. Greene, late Chief Eng'r "Croton Aqueduct," N. Y. City; Hon. P. C. Wright, 59 Liberty street, N. Y.; J. Edw'd Bering, Eg'r and Sup't "Sterling Iron Co," 42 Pine street, N. Y.; Dr. Edward Foreman, "Smithsonian Institute," Washington, D. C.; Henry Blackstone, Chief Eng'r, Pittsburgh; Rob't Cravens, Iron Master, Chattanooga, etc., etc, etc.

E. F. DUNNE,

Attorney and Counsellor at Law,

1301 F STREET, WASHINGTON, D. C.,

PACIFIC COAST.—Will practice in all the Federal Courts.

Specialty in Patents for Lands, Mines, and Town-Sites.
mar15-1y

U. S. PATENT OFFICE,
WASHINGTON, D. C., May 11, 1871.

On the petition of JOHN TOULMIN of Worcester, Mass., praying for the extension of a patent granted to him on the 25th day of August, 1857, for an improvementin Vibrating Shears.

It is ordered that the testimony in the case be closed on the 25th day of July next, that the time for filing aguments and the Examiner's report be limited to the 4th day of August next, and that said petition be heard on the 9th day of August next. Any person may oppose this extension.

M. D. LEGGETT, Commissioner.

THEODORE ALLEN,
ENGINEER,
No. 45 William street, New York.

Designs and Specifications prepared for all kinds of Iron Ships and Steam Machinery. Construction and Repairs superintended. Experiments conducted. Advice given, etc. All kinds of Machinery furnished at Manufacturers' prices.
feb8-td

WILLIAM F. McNAMARA,

SOLICITOR OF PATENTS

AND COUNSELLOR-AT-LAW,

No. 37 PARK ROW, NEW YORK, ROOM 22.

Advice in Patent Law given free. mar 3:tf

BIDWELL'S COAL OIL AXLE GREASE.

THE BEST IN THE MARKET.

USED BY

RAILROAD MANUFACTURING COMPANIES,

ROLLING MILLS, AND UPON VEHICLES OF ALL KINDS.

SEND FOR CIRCULAR AND PRICE LIST.

DANIEL BIDWELL, MANUFACTURER.
254 PEARL STREET,
m 28:6mos NEW YORK.

DIAMONDS AND CARBON furnished and set for drilling rock, sawing or working stone, also *Glazier's Diamonds*. See ENGINEERING AND MINING JOURNAL, January 17, 1871, for further particulars.

Address: JOHN DICKINSON, 64 Nassau st., N. Y.
feb14:3mo

H. A. ROGERS & CO,

Successors to

JOHN ASHCROFT, and WALTON & Co.,

Railway & Machinists' Supplies,

50 and 52 JOHN STREET.

Sole Agents for
ASHCROFT'S STEAM GAUGE,
Also Agents for
LINDSAY WRENCHES,
SHURTEVANT BLOWERS,
JULSON GOVERNORS,
WILDER'S PATENT PIPE-WRENCH AND CUTTER.
Manufacturers of
STEAM and WATER GAUGES,
Importers and sole agents for the United States of
SCOTCH GAUGE GLASSES.

Steam Gauges Repaired.

2.1y

CUMBERLAND COAL,

MINED BY THE

CONSOLIDATION COAL COMPANY,

Of the best quality for manufacturing, steam generating, and domestic purposes.

Orders received by the Cargo at
New York Office, 71 Broadway.
New England Agency,
STEVENSON & PEIRSON,
48 Kilby street, Boston.
Baltimore and Georgetown Agency,
G. MEREDITH, South Gay street,
Mch 7 tf Baltimore.

AGENTS AND CANVASSERS WANTED.

IN EVERY CITY AND TOWN IN THE UNITED STATES.

FOR THE

Engineering and Mining Journal.

Liberal inducements. Specimens sent free. Address,
37 Park Row, New York.

WILLARD P. WARD, Manager.

COAL SHIPPERS.

WHITE, FOWLER & SNOW.

Wilkesbarre and Lehigh Coal,

FOR STEAM AND FAMILY USE.

OFFICE:
Room No. 49, 111 BROADWAY, (Trinity Building).
JNO. WHITE,
jan1-1y LINDLEY H. FOWLER,
LOUIS T. SNOW.

THE NEWBURGH ORREL COAL COMPANY.

Mines at Newburgh, Preston Co., W. Va.
Company's Office, No. 52 S. Gay St. Baltimore, Md.
C. OLIVER O'DONNELL.....President.
CHAS. MACKALL.....Secretary

This Company offer their very superior Gas Coal at lowest market prices.

It yields 10,996 cubic feet of gas to the ton of 2,240 lbs. of good illuminating power, and of remarkable purity; one bushel of lime purifying 6,792 cubic feet, with a large amount of coke of good quality.

It has been for many years very extensively used by various Gas Companies in the United States, and we beg to refer to the Manhattan, Metropolitan, and New York Gas Light Companies of New York, the Brooklyn and Citizens' Gas Light Companies of Brooklyn, N. Y., the Baltimore Gas Light Company of Baltimore, Md., and Providence Gas Light Company, Providence, R. I.

The best dry coals shipped, and the promptest attention given to orders. sep21-1y

---

RANDOLPH BROTHERS, Sole Agents of the original

Spring Mountain Lehigh Coal.

Extensively used for Smelting Iron.

☞Rooms, 28 and 30 Trinity Building,
Ap6tf NEW YORK.

WILKESBARRE COAL, DELIVERED DIRECT from the Mines of

The Wilkesbarre Coal and Iron Co.,

or for re-shipment at

HOBOKEN AND JERSEY CITY.

OFFICE:
ap1-1y 89 Broadway, New York.

THE DESPARD COAL COMPANY OFFER THEIR Superior DESPARD COAL to Gas Light Companies throughout the country.

MINES IN HARRISON COUNTY, West Virginia.

Wharves, Locust Point, } Baltimore.
Company's Office, No. 29 South st. }

AGENTS:

PARMELEE BROTHERS, No. 32 Pine street, New York. BANGS & HORTON, No. 31 Doane street, Boston.

Among the consumers of Despard Coal we name Manhattan Gas Light Co., New York; Metropolitan Gas Light Co., New York; Jersey City Gas Light Co., Jersey City, N. J.; Washington Gas Light Co., Washington, D. C. Portland Gas Light Co., Portland, Maine.

☞ Reference to them is requested. may30-1y

LEWIS AUDENRIED & CO., MINERS AND SHIPpers of the following celebrated

ANTHRACITE COALS.

From Philadelphia and the Mines,

DIAMOND, Red Ash; SPOHN, Red Ash; ORCHARD, Pink Ash; BROAD MOUNTAIN, White Ash; LOCUST MOUNTAIN, White Ash; BLACK HEATH, White Ash; Old Company's Lehigh; Wilkesbarre.

From Port Johnston and Jersey City,

Old Co.'s Lehigh, Hazleton, Wilkesbarre, and Shenandoah Coals.

Also the superior CUMBERLAND COALS.

BROAD TOP,	BARTON,	BARTON,
SEMI-BITUMINOUS,	GEORGES CREEK,	GEORGES CREEK,
at Philadelphia.	at Baltimore.	at Alexandria.

205 Walnut street, Philadelphia; 14 Kilby street, Boston, 34 Westminster st., Providence; 24 Second st., Baltimore,
110 BROADWAY, NEW YORK. Jan13.y

G. B. LINDERMAN & CO.,

MINERS,

Sugar Loaf, Lehigh Coal.

OFFICE, 50 TRINITY BUILDING, 111 BROADWAY
may23-1y NEW YORK.

COXE BRO.'S & CO., CROSS CREEK COLLIERY MINers and Shippers of the Celebrated

Cross Creek Free Burning Lehigh Red Ash COAL.

FROM THE BUCK MOUNTAIN VEIN.

OFFICES;
Philadelphia, No. 341 Walnut street.
Drifton, Jeddo P. O., Luzerne Co., Pa.

Agent in New York, SAMUEL BONNELL, Jr.,
Room 43, Trinity Building,
feb-1y 111 Broadway.

SAMUEL BONNELL, JR., OFFERS FOR SALE HIS SUGAR CREEK and HONEY BROOK

LEHIGH COALS,

OFFICE:
43 and 45 TRINITY BUILDING, 111 BROADWAY,
NEW YORK. Jan:1y

MAGIC LANTERNS FOR SUNDAY SCHOOLS, Academies, Public Exhibitions, and Parlor Entertainments. Illustrated priced catalogues sent free.

T. H. McALLISTER, Optician,
Dec.21:6m, 49 Nassau street, N. Y.

Advertisements.

The special advantages of the ENGINEERING AND MINING JOURNAL, *as a medium for advertisers, are so great and so widely known that it may seem almost needless to call attention to them. It is extensively circulated among the engineers of the country and takes a position in this respect before any other publication of the kind. It has a large and constantly increasing circulation among miners and mine owners, and men connected with mining operations generally. As it is the only paper in the country that makes this subject a specialty it has this field entirely to itself, and is the only direct and reliable means of reaching this class of persons. Being kept on file by almost every subscriber, it is dou'ly valuable as a permanent means of keeping an advertisement before the pu'lic It is the recognized organ of the coal trade, and is taken extensively by the trade throughout the country, and presents the very best means of reaching that very important class of men.*

Rates of Advertising.

The rates of advertising, compared with those of other weekly industrial publications, are very low, especially when the class of consumers among which its large circulation is almost entirely confined, is taken into consideration.

Back Page .....40 cents a line.
Inside Pages .....25 cents a line.

Engravings may head advertisements at the same rate per line, by measurement, as the letter-press.

MISCELLANEOUS.

THE CHALMERS-SPENCE PATENT NON-CONDUCTOR CO.

HEAD OFFICE: MORGAN IRON WORKS, NEW YORK.
ST. LOUIS BRANCH,
1202 & 1204 N. Second street.

Never deteriorates. Saves 20 per cent. Keeps steam perfectly dry. Thirty of the largest Mississippi boats have their boilers, pipes, etc., covered with this invaluable material.

J. B. ROACH, Treasurer. J. CHALMERS, Manager.
71

The Engineering
AND
MINING JOURNAL

In addition to the many attractive, interesting and valuable features already associated with this Journal as a

Technical and Professional Organ,

the Editors have determined to incorporate into its columns a

Department of Popular Science,

containing readable articles on the latest results of scientific inquiry in every realm of knowledge. This department is

Added to the usual Reading Matter,

since the space for it is obtained by omitting the weekly lists of the U. S. Patent Office, now no longer required by our business, since the

ENGINEERING AND MINING JOURAL,

under its present management is

Not Connected with any Patent Agency.

BUY A COPY; READ THE DEPARTMENT OF POPULAR SCIENCE: SEE THE

GENERAL EXCELLENCE

OF THE PAPER, AND SEND YOUR SUBSCRIPTIONS TO

WILLARD P. WARD, Manager,
P. O. Box 4404. *37 Park Row.*

J. THOULET & C. RASCHER, MINING AND CIVIL Engineers, Maps, Topographical and Mining Surveys, Superintendence of Mines, Metallurgical and Chemical Works, Examinations and Reports on Coal and Metallic Mines, Assays, etc., Oriental building, 122 La Salle street, Chicago.

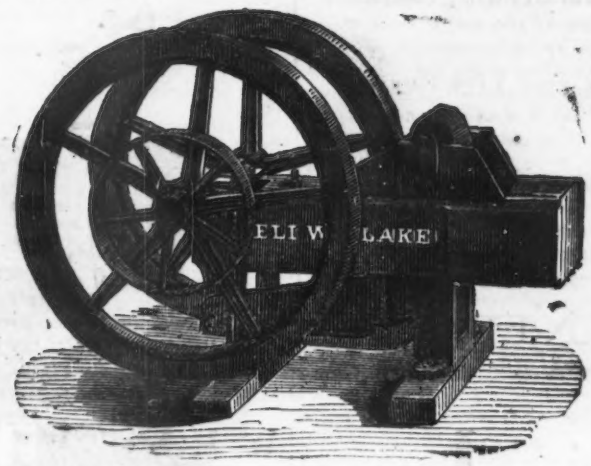
WOOD ENGRAVING

EXECUTED AT THE OFFICE OF

The Engineering and Mining Journal
No. 37 PARK ROW, NEW YORK CITY.

MISCELLANEOUS.

BLAKE'S STONE BREAKER.



The office of this Machine is to break Ores and Minerals of every kind into small fragments, preparatory to their further comminution by other machinery.

This machine has now been in use, enduring the severest tests, for the last ten years, during which time it has been introduced into almost every country on the globe, and is everywhere received with great and increasing favor as a labor-saving machine of the first order.

Illustrated circulars, fully describing the machine, with ample testimonials to its efficiency and utility, will be furnished on application, by letter to the undersigned.

☞ The Patents obtained for this machine in the United States and in England having been fully sustained by the courts, after well contested suits in both countries, all persons are hereby cautioned not to violate them; and they are informed that every machine now in use or offered for sale, not made by us, in which the ores are crushed between upright convergent faces or jaws actuated by a revolving shaft and fly-wheel, are made and used in violation of our patent.

Mch. 14-1y. **BLAKE BROTHERS, New Haven, Conn.**

JOHN A. GRISWOLD, ERASTUS CORNING. ERASTUS CORNING, JR., CHESTER GRISWOLD.

JOHN A. GRISWOLD & CO.,

PROPRIETORS OF THE

RENSSELAER IRON WORKS,

TROY, N. Y.

Bessemer Steel Works, Fort Edward Blast Furnace and Columbia Blast Furnace

MANUFACTURERS OF PIG IRON, RAILROAD, MERCHANT AND SHIP IRON,

Bessemer Steel Rails, Axles, Tyres, Shafting Plates and Steel Forgings,

OF ALL DESCRIPTIONS.

Office in New York, No. 56 Broadway.

May 17:1y

LEHIGH ZINC COMPANY.

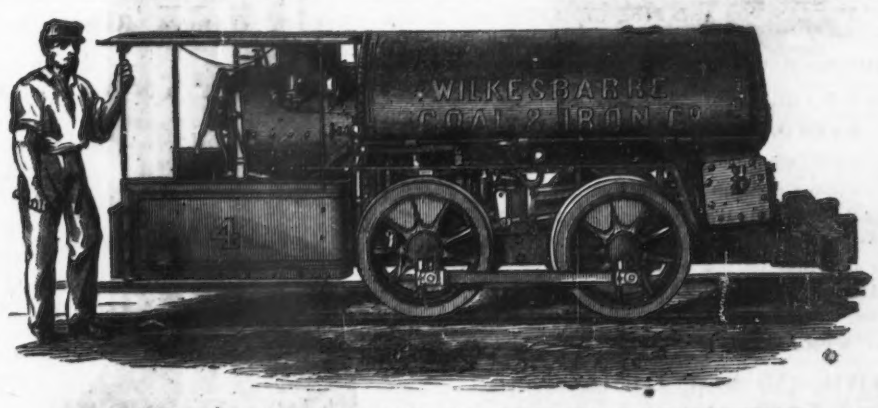
GORDON MONGES, Treasurer. B. C. WEBSTER, President.

WORKS, BETHLEHEM, PA. OFFICE, 333 Walnut Street, Philadelphia.

JOHN JEWETT & SONS, AGENTS, 182 FRONT STREET, NEW YORK.

OXIDE OF ZINC, SPELTER, SHEET ZINC.

Jun28:1y **SPIEGELEISEN CINDER FOR BLAST FURNACES.**



IMPROVED DIRECT-ACTING MINING LOCOMOTIVE.

Gauge, two feet six inches or upwards; Hight above rail, five feet four inches; Width over all, five feet one inch; Adapted to burn Anthracite or Bituminous coal or coke.

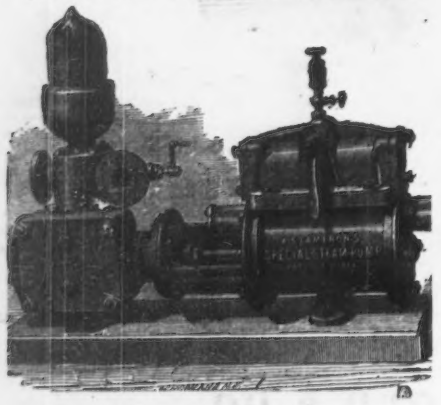
Materials and Workmanship Equal to those in Full Gauge Railroad Locomotives.

Guaranteed to pass curves of twenty-five feet radius and haul on a level track in good condition
Three Hundred and Forty Gross Tons of Cars and Load.
For Photograph and full particulars, address
M. BAIRD & CO.,
Feb:7:1y:eow Baldwin Locomotive Works, Philadelphia.

STEAM PUMPS.

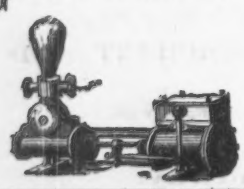
THE WOODWARD
Steam Pump Manufacturing Company,
MANUFACTURERS OF THE
WOODWARD PATENT IMPROVED SAFETY
Steam Pump and Fire Engine.
STEAM, WATER, AND GAS FITTINGS OF ALL KINDS.
Also dealers in WROUGHT IRON PIPE, BOILER TUBES, etc. Hotels, Churches, Factories, and Public Buildings, heated by Steam, Low Pressure.
Woodward Building, 76 and 78 Centre street, corner Worth street, New York. Formerly 77 Beekman street.
mar 14-1y GEORGE M. WOODWARD, Pres't.

PUMPS
IN EVERY POSSIBLE VARIETY.



A. S. CAMERON & CO.,
FOOT 23d STREET, E. R.,
oct18:1y NEW YORK.

GUILD & GARRISON, MANUFACTURERS OF

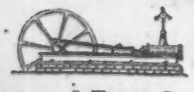


Steam Pumps,
Vacuum Pumps,
Steam Engines
Vacuum Pans,
And all the various connections. For sale at the STEAM PUMP WORKS, 26, 28 and 30 First street, Williamsburgh, N. Y.
sep14-6m

Niagara Steam Pump Works.

CHARLES B. HARDICK,
No. 9 ADAMS STREET, BROOKLYN, N. Y.,
Sole Manufacturer of
HARDICK'S PATENT DOUBLE-ACTING
STEAM PUMPS AND FIRE ENGINES,
Patented in England, Belgium and France. Send for circular.
feb-13-1y

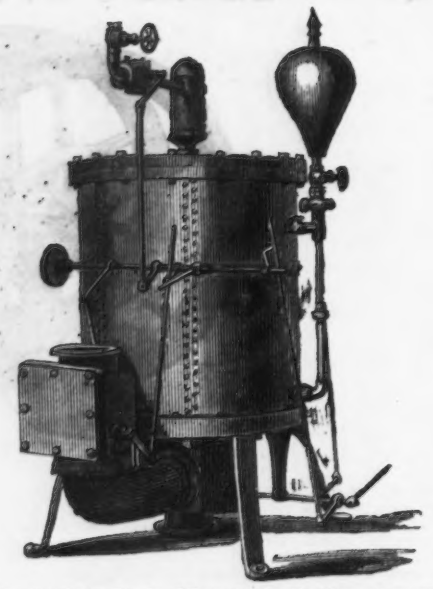
Fishkill Landing Machine Works,
Established 1853.
FISHKILL-ON-THE-HUDSON, N. Y.



STEAM ENGINES,
Iron and Brass Castings, Forgings, Boilers and Machinery.
Sole Manufacturers of the celebrated LOOMIS STEAM ENGINE, with Patent Variable Cut-off by the Governor.
Jobbing and Repairs promptly attended to.
JAS. L. TELLER, Secretary. MILO SAGE, President.
sept18:1y 2

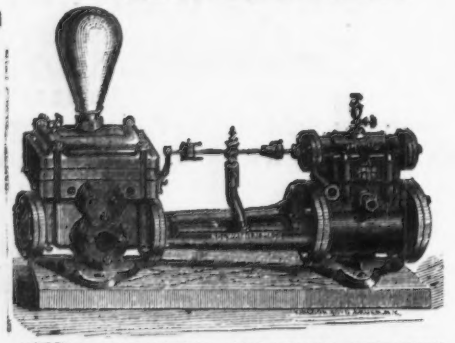
MISCELLANEOUS.

PATENT AUTOMATIC STEAM VACUUM PUMP.



For City Water-Works, Mines, Railroads, Steamships, Breweries, Sugar Refineries, Tanneries, and various Manufacturing purposes.
Manufactured by the Automatic Steam Vacum Pump Manufacturing Co. Office, 85 Liberty st., New York.
2 doors West of Broadway.
SIMEON N. DRAKE, Pres. MARTIN KLENEN,
Send for Illustrated Circular. feb22 6m

KNOWLES'
STEAM PUMPS.



PUMPS GUARANTEED FOR EVERY SITUATION.
KNOWLES & SIBLEY,
Warehouse. 90 and 92 Liberty st.,
NEW YORK.
Works at Warren, Mass.
ap:18:3mos

NASON'S VERTICAL TUBE RADIATORS,

IN VARIOUS SIZES AND PATTERNS.
JOSEPH NASON & CO., 61 BEEKMAN ST., corner of Gold street.—WROUGHT and CAST-IRON PIPES; all kinds of STEAM and GAS FITTINGS; Apparatus for WARMING and VENTILATING BUILDINGS.
JOSEPH NASON. HENRY R. WORTHINGTON.
my29-6m

MISCELLANEOUS.

E. B. BENJAMIN,
10 Barclay Street,
IMPORTER OF
CHEMISTS AND ASSAYERS' UTENSILS,
In every variety.
Assay Balances,
Furnaces,
Chemicals,
Blow Pipe Sets,
In cases and details.
Crucibles, Cupels, etc.
Also, a very large stock of choice and rare chemicals, and glassware for use in laboratories. may23

DUNCAN, SHERMAN & CO.,
BANKERS,
CORNER OF PINE AND NASSAU STREETS,
NEW YORK.
ISSUE CIRCULAR NOTES AND LETTERS OF CREDIT FOR TRAVELERS, AVAILABLE IN ALL THE PRINCIPAL CITIES IN THE WORLD.
TRANSFERS OF MONEY TO EUROPE AND THE PACIFIC COAST BY TELEGRAPH.
☞ Interest allowed on Deposits. feb-1v

U. S. PATENT OFFICE,
WASHINGTON, D. C., May 26, 1871.
On the petition of THOMAS J. CHUBB of New York N. Y., praying for the extension of a patent granted to him on the 25th day of August, 1857, for an improvement in Separating Ore.
It is ordered that the testimony in the case be closed on the 25th day of July next, that the time for filing arguments and the Examiner's report be limited to the 4th day of August next, and that said petition be heard on the 9th day of August next. Any person may oppose this extension. M. D. LEGGETT, Commissioner.

U. S. PATENT OFFICE,
WASHINGTON, D. C., May 11, 1871.
On the petition of JOSEPH W. BUDD, of Midland City, Michigan, Administrator of ISRAEL DODENHOFF, deceased, praying for the extension of a patent granted to the said ISRAEL DODENHOFF, on the 18th day of August, 1857, for an improvement in Raking Apparatus for Harvesters.
It is ordered that the testimony in the case be closed on the 18th day of July next, that the time for filing arguments and the Examiner's report be limited to the 28th day of July next, and that said petition be heard on the 2d day of August next. Any person may oppose this extension. M. D. LEGGETT, Commissioner.

ADOLPH OTT,
CHEMICAL ENGINEER.
May be employed professionally as an expert on practical subjects, involving both Chemical and Mechanical knowledge. A specialist in various branches of Technology. Assays and Analyses of all kinds. Address, Editorial Rooms of the "Engineering and Mining Journal," 37 Park Row, New York City.
☞ Written communications preferred. nov28-tf

THE ENGINEERING
AND
MINING JOURNAL,
A weekly periodical containing all the news of special interest to
CIVIL & MINING ENGINEERS,
as well as many descriptions and illustrations of NEW MACHINERY for
MECHANICAL ENGINEERS.
The full and accurate weekly reports of the Mining and Transportation Companies engaged in
THE COAL TRADE
give it a FINANCIAL VALUE which has gained for it an extensive circulation among Manufacturers and all Coal Dealers and buyers in the country. An excellent
ADVERTISING MEDIUM
for the branches to which it is specially devoted, as it reaches the SUPERINTENDENTS, PROPRIETORS and ENGINEERS.
Price $4 per Annum.
Specimen copies free. Address
WILLARD P. WARD,
P. O. Box 4101. Manager.
No. 37 PARK ROW, NEW YORK.

P. H. VAN DER WEYDE, M. D.,
(Late Professor of the N. Y. Medical College, of Mechanics, etc., at the Cooper Institute, and of Industrial Science at the Girard College, Philadelphia.)
Analytical & Consulting Chemist and Engineer.
837 Pacific avenue, above Grand avenue, Brooklyn.
Office ENGINEERING AND MINING JOURNAL, 37 Park Row, New York City. jan30tf

MACHINISTS' SUPPLIES.

B. F. STURTEVANT'S
PATENT IMPROVED
PRESSURE BLOWER,
FOR CUPOLA FURNACES AND FORGES.

Also manufacturer of the Sturtevant Patent Improved Fan Blower and Exhaust Fan. Send for illustrated catalogue.
B. F. STURTEVANT, 72 Sudbury street, Boston, Mass.
n29:1y

E. LYON,
MANUFACTURER OF
Patent Portable Hydraulic Jacks and Punches.
470 GRAND STREET, NEW YORK

For Raising Heavy Weights, such as Locomotives Boilers, Guns, Heavy Machinery, Wrecking Purposes, putting together Water and Gas Pipes, pushing off Cranks and Propellers, Pulling, Proving Chains and Ropes, setting up Rigging, or Pulling Stumps, Punching and Shearing Iron, Die-Sinking, etc.

☞IMPROVED PATENT HYDRAULIC JACKS, that run out their entire length in a HORIZONTAL or any other position.

PATENT HYDRAULIC PUNCH,
For Punching Iron, Die-Sinking, etc. Ap 12;1y

KROM'S PATENT DRY ORE CONCENTRATOR
AND COMPLETE MACHINERY FOR CRUSHING SCREENING AND CONCENTRATING ORES.

Krom's Dry Ore Separator and Concentrator Outrivals all others in its Simplicity and in the perfect manner in which it Concentrates the various Ores.

Minerals and Ores in which the difference of specific gravity is so slight and which are also sometimes in such fine particles as to defy separation by any other machinery or method, are readily separated by this Concentrator.

It is warranted also to separate diamonds and other precious stones from sand and pebbles.—A feat never before accomplished by machinery.

Mr. W. Bement, of Georgetown, Col., concentrating Silver ores, says: "I am satisfied your machines can not be beaten; they are simple, require no power (comparatively,) and do not get out of order."

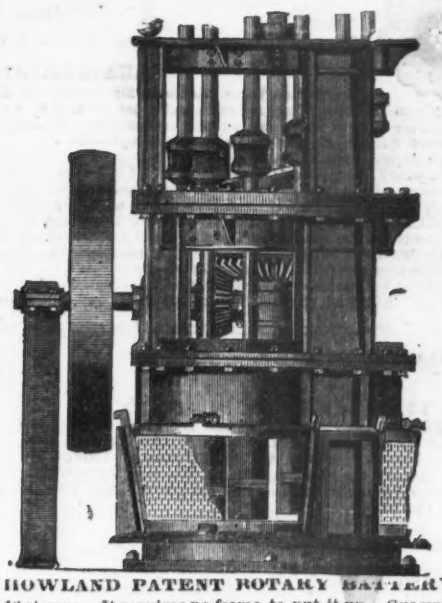
A comparison is challenged between the results obtained by the approved methods of water concentration and the complete system of dry-ore concentration in the amount of ore saved, quantity concentrated, economy of working, and comfort of the operators and workmen.

Parties interested in mining are invited to call at No. 210 Eldridge street, New York, where they may see a machine in operation and have samples of their own ores crushed and concentrated.

For information and circulars, apply to
S. R. KROM,
No. 210 Eldridge street, New York City.

MINING MACHINERY, ETC.

MINING MACHINERY OF ALL KINDS. MANUFACTURED BY MOREY & SPERRY.



HOWLAND PATENT ROTARY BATTERY
of 12 stamps. It requires no frame to put it up. Guaranteed to crush 2½ to 3 tons per day to the stamp. The best Battery ever used for amalgamating gold, or crushing silver ores, dry or wet. Can be put up on a mine in running order for one-half the price of the straight battery, and in three days after its arrival at the mine. 12-stamp battery, 20,000 pounds, with frame complete; 6-stamp battery, 7,000 pounds. Every mill run at shop before shipping.

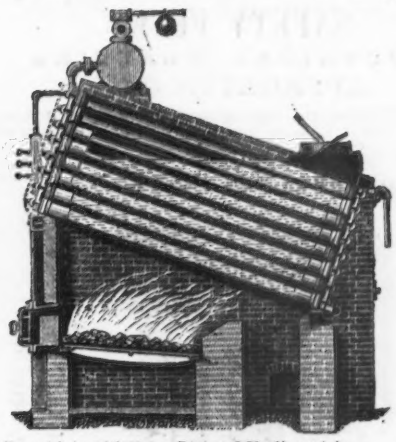
CALIFORNIA STAMP MILLS,

All the various styles of Pans, Amalgamators, Rock Breakers, Separators, Settlers, Concentrators, Dry or Wet, for working Gold, Silver or Copper Ores, the same as built in California and at lower prices. SHOES AND DIES made of the best white iron. Send sizes and we will make patterns and forward Shoes and Dies at low prices. Engines, Boilers and fixtures, and other Machinery made to order. Also, Howland's Patent Rotary Valve Double or Single Engines.

Irons for the best California stamp mill, straight battery, complete. Also, Irons for low mortar, old style mill, and all other kinds.

☞ Send for a Circular.
Address MOREY & SPERRY,
Jan 10:y 95 Liberty Street New-York.

ROOT'S SAFETY BOILER.
THE BEST IN THE MARKET.



For Pamphlets with Price-List and Testimonials,
Address ROOT STEAM-ENGINE CO.,
2d Avenue, cor 28th Street,
april:18:3mos New York.

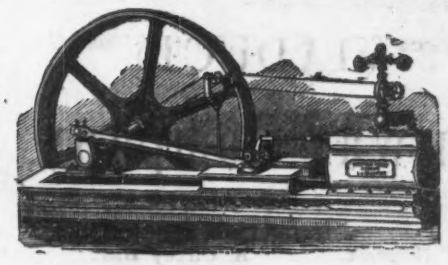
J. CLAYTON'S
Patent Fly Wheel
STEAM PUMP,
AND
STEAM ENGINE
COMBINED.

These pumps are the cheapest first-class pumps in the market.

All sizes made to order at short notice.

JAMES CLAYTON, 24 & 26 Water st.,
Nov18-tf Brooklyn, N. Y.
Office: 50 & 52 Johnstreet, New York.

ENGINES, IRON WORK, ETC.



TODD & RAFFERTY.
GENERAL
MACHINERY MERCHANTS, ENGINEERS, AND MACHINISTS,

Manufacturers of Stationary and Portable Steam Engines and Boilers; also Flax, Hemp, Tow, Oakum, and ROPE MACHINERY,
MILL GEARING,
SHAFTING.
Lathes, Planers, Drills, Chucks, etc. Iron and Brass Castings. Judson & Snow's Patent Governors constantly on hand.
OFFICE AND WAREROOMS, 10 BARCLAY STREET, N.Y.
Office and Works, Paterson, New Jersey.
JOSEPH C. TODD oct-27-tf. PHILIP RAFFERTY

COOPER'S GLUE AND REFINED GELATINE

COOPER HEWITT, & CO.,
NO. 17 BURLING SLIP, NEW YORK.
Bar Iron, Braziers' Rods, Wire Rods, Rivet and Machinery Iron, Iron and Steel,
Wire of all Kinds, Copperas,
&c., &c.
RAILROAD IRON, COOPER WROUGHT IRON BEAMS AND GIRDERS,
Martin Cast-Steel, Gun-Barrel and Component Iron,
PUDDLED AND REFINED CHARCOAL BLOOMS,
Ringwood Anthracite and Charcoal Pig Iron.
Works at Trenton and Ringwood, N. J.
May 17:1y

ALBERT BRIDGES,
MANUFACTURER AND DEALER IN
Railway and Mining Supplies and Machinery.

Hot and Cold Punched Nuts, Bolts, Lag Screws and Washers.
Belting, Packing, Hose, Rubber Springs, Car Trimmings, Steam Pumps.

Ball's Patent Telescope Jack.
NO. 46 CORTLANDT STREET,
P. O. Box, 2843. NEW YORK
Aug 31-1y

Four First Premiums, American Institute, 1870.

THE ALLEN ENGINE WORKS,
Fourth Av. and 130th and 131st Streets,
New York City.
MANUFACTURERS OF

THE ALLEN ENGINE

PORTER'S GOVERNOR,
The Allen Boiler, and
STANDARD STRAIGHT-EDGES,
Surface-Plates, and Angle-Plates.
Four First Premiums awarded at the Fair of the American Institute, 1870.
Send for an Illustrated Circular. dec1-1y

THE NEW YORK

(VIADUCT)

Railway Company.

DIRECTORS:

Alex. T. Stewart,	A. Cazey Hall,
Wm. M. Tweed,	John Jacob Astor,
August Belmont,	Peter B. Sweeney,
Charles A. Lamont,	Levi P. Morton,
James F. P. Lanier,	Hugh Smith,
Franklin Osgood,	Wm. T. Blodgett,
Wm Butler Duncan,	Richard O'Gorman,
John J. Bradley,	Jose F. Navarro,
Charles L. Tiffany,	Henry Smith,
Wm. R. Travers,	Edward B. Wesley,
Joseph Seligman,	Manton Marble,
Richard B. Connolly,	J. Taylor Johnston,

Henry Hilton.

HENRY HILTON,
President,
HUGH SMITH,
Vice-President,
W. BUTLER DUNCAN,
Treasurer.
EDWARD P. BARKER,
Secretary.

By authority of the Board of Directors of THE NEW YORK RAILWAY COMPANY, and in conformity with the terms of the Act of Incorporation in that respect, the undersigned Commissioners on Stock Subscriptions give public notice for and on behalf of the Directors, and of such Company that Books of Subscriotion for the Capital Stock thereof will be opened on WEDNESDAY, THE TWENTY-EIGHTH DAY OF JUNE instant, at the following places in this city, namely :

At the Banking House of
DUNCAN, SHERMAN & CO.,
No. 11 Nassau street.

At the Banking House of the
BANK OF THE METROPOLIS,
No. 31 Union square.

The Company is authorized to construct two Viaduct Railways or branches through the City of New York, on the east and west sides thereof, from a common starting point at or near Chambers street, between Broadway and Chatham street; also across the Harlem River and through Westchester County; with power to build additional lines of railway or branches, from time to time, in any part of the City or Westchester County. *The property acquired by the Company is exempted from taxes and assessments during the period allowed for the final completion of the railway in the city.* The Mayor, Aldermen and Commonalty of New York are authorized and directed, with the approval of the Commissioners of the Sinking Fund, to subscribe for **five millions of dollars** of the stock of the company, whenever one million of dollars thereof has been subscribed for by private parties. *This conditional amount of stock has been wholly subscribed for and taken by the Directors of the Company.* On the completion of either of the lines of railway to the line of Westchester County, the Supervisors of that County are authorized to issue the bonds of the County to such amount as the Supervisors shall deem expedient, to aid in the construction and extension of the railway in and through that County. For the proper equalization of the interest of shareholders who may subscribe and pay in moneys at different times, the Directors are authorized to issue scrip for interest on such payments, payable out of the earnings.

THE TERMS OF SUBSCRIPTION will be as follows :

TEN PER CENT of the amount of Stock subscribed for, to be paid in cash at the time of subscription. The residue to be paid as called for by the Board of Directors, on a notice of thirty days, but no call at any one time to exceed ten per cent.

Scrip for interest at the rate of seven per cent. per annum will be issued by the Company, payable out of the first earnings of the Railway on all installments paid on Stock subscribed for within thirty days after the Books Subscription shall be opened.

The Company reserves the right to close the Subcription Books at any time after the twenty-ninth day of July, 1871.

By order of the Board of Directors,

Alexander T. Stewart, Commissioners
John JacobAstor, on behalf of
Levi P. Morton, the Company.

NEW YORK, June 16, 1871.

THE BISHOP GUTTA-PERCHA WORKS,

422, 424 & 426 East 25th St., Office at Factory, New York.

SAMUEL C. BISHOP, Proprietor,

The *only* manufacturer in the United States of every variety of goods, made from *Pure Gutta Percha.*

SUBMARINE TELEGRAPH CABLES.

Submarine Wires, insulated for Mining and Blasting use.

Telegraph and Electric Wires for office and other uses, of all sizes ; Cotton and Silk Covered Wires, of all sizes ; Bishop's Compound Cordage for air lines and outside connections ; Underground Wires, covered with Gutta-Percha and Lead protection ; Underground Wires, with fibre and Bishop's Compounds.

Any kind required made to order.

In addition to Telegraph and Electric Goods, I make all kinds of Pure Gutta-Percha goods, such as Belting for use in Water ; Sheet for Surgical use ; Sheet for various Mechanical uses ; Lining for Acid and Chemical Baths ; Bottles, Pachers, and Funnels for Acids ; Tissue Sheets for Caps and Hats ; Soda and Beer Pipe ; Bosses for Flax Machinery, etc., etc.

N. B.—TILLOTSON & CO., 5 Dey street, New York, and BLISS, TILLOTSON & CO., 247 South Water street, Chicago, are General Agents for the sale of any Telegraph and Electric Goods made by me, at Factory prices.

JOHN THORNLEY, 603 Chestnut street, Philadelphia, Pa., is Agent for the sale of any goods made by me at Factory prices.

☞ Orders also received at Factory for all kinds made.

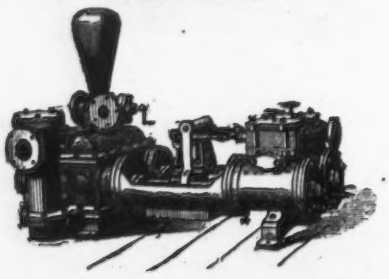
Any goods of my manufacture, "excepting Telegraph and Electric Goods," are for sale in New York, by H. G. NORTON & CO., 26 Park Place ; RUBBER CLOTHING Co., 347 Broadway ; D. HODGMAN, 27 Maiden Lane, New York. sep13:1m,

HYDRAULIC WORKS.

MANUFACTORY,
BROOKLYN, N. Y.

Steam Pumping Engines, Single and Duplex, Worthington's Patent, for all purposes, such as Water Works Engines, Condensing or Non-condensing ; Air and Circulating Pumps, for Marine Engines ; Blowing Engines ; Vacuum Pumps, Stationary and Portable Steam Fire Engines ; Boiler Feed Pumps, Wrecking Pumps,

MINING PUMPS,



Water Meters, Oil Meters ; Water Pressure Engines. Steam and Gas Pipe, Valves, Fittings, etc. Iron and Brass Castings.

☞ Send for Circular.

H. R. WORTHINGTON,
feb1-1y 59 Beekman street, New York.

LAFLIN & RAND,

POWDER CO., 21 Park Row, opposite Astor House, New York,

invite attention to their facilities for delivering

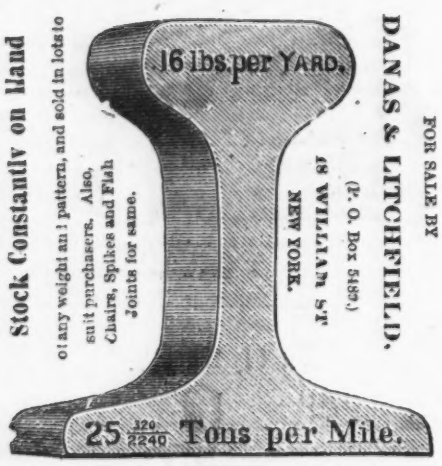
BLASTING POWDER,

SAFETY FUSE,

ELECTRICAL BLASTING APPARATUS, &c.,

wherever required, from having nine manufactories in different States, beside agencies and magazines at all distributing points. nov. 1:1y

RAILROAD IRON FOR MINES.


16 lbs. per YARD.
25 120/2240 Tons per Mile.
Stock Constantly on Hand
of any weight and pattern, and sold in lots to suit purchasers. Also, Chairs, Spikes and Fish Joints for same.
DANAS & LITCHFIELD.
FOR SALE BY
18 WILLIAM ST.
NEW YORK.
(P. O. Box 5963)

Light Locomotives, for use in Collieries, Mines, etc.
m. h13-6m

CARL DITTMAR'S

PATENT

DUALIN.

NEW EXPLOSIVE,

EQUAL IN STRENGTH TO NITRO-GLYCERINE. SAFER THAN GUN-POWDER.

Factory and Office, Neponset, Mass.

feb 21:3m

SCHOOL OF MINES, COLUMBIA COLLEGE.

FACULTY.—F. A. P. BARNARD, S.T.D., LL.D., PRESIDENT ; T. EGLESTON, Jr., E. M., Mineralogy and Metallurgy ; F. L. VINTON, E. M., Civil and Mining Engineer ; C. F. CHANDLER, PH. D., Analytical and Applied Chemistry ; JOHN TORREY, M.D., LL.D., Botany ; C. A. JOY, PH. D., General Chemistry ; W. G. PECK, LL.D., Mechanics ; J. H. VAN AMRINGE, A.M., Mathematics; O. N. ROOD, A.M., Physics; J. S. NEWBERRY, M.D. LL.D., Geology and Paleontology. Regular courses in Civil and Mining Engineering ; Metallurgy; Geology and Natural History; Analytical and Applied Chemistry. Special students received for any of the branches taught. Particular attention paid to Assaying. For further information and catalogues, apply to

DR. C. F. CHANDLER,
nov21-1y-is Dean of the Faculty.

NEW YORK BELTING AND PACKING COMPANY. The oldest and largest manufacturers in the United States of

Vulcanized Rubber Fabrics,

Adapted to Mechanical Purposes,

invite the attention of all who are interested in the sale or use of such articles to the high standard quality and low prices of their various manufactures, comprising

Machine Belting, Steam Packing, Leading Hose, Suction Hose, Car Springs, Wagon Springs, Billiard Cushions, Grain Drill Tubes, etc., etc., etc.,

"TEST" HOSE

made expressly for the use of Steam Fire Engines, and will stand a pressure of 400 pounds per square inch. Officers of Fire Departments requiring new hose, will find this much superior in strength and quality to any other.

PATENT SOLID EMERY VULCANITE WHEELS, a composition of rubber and emery, making a very hard uniform substance of the nature of stone throughout. These wheels for grinding and polishing metals, "gumming" saws, etc., are the most economical and effective tools that can be used.

WAREHOUSE, 37 AND 38 PARK ROW, NEW YORK.
JOHN H. CHEEVER, Treasurer.

☞ Price lists and further information may be obtained by mail or otherwise on application.
oct30-1y-os

HORTON & MABIE
PEEKSKILL, NEW YORK.
Fire Brick Works.

MANUFACTURERS OF ALL SHAPES OF

FIRE BRICK

FOR IRON WORKS, LIME KILNS, FANNERS,

&c., &c., &c.

Particular attention given to the manufacture of linings for Cupola Furnaces.

Blocks and Tiles for all Purposes.

BRASS FURNACE CIRCULARS.

Stove and Range Linings of every description to order.
nov1:1y

AVOID LEAD POISON.—TIN-LINED LEAD PIPE is the only water-pipe in the market which combines safety to health with strength, durability, facility of bending, and making perfectly tight joints. Water flows through it as pure as if drawn through silver. It is approved by all the leading chemists and physicians in the country; also, the Water Commissioners of New York, Brooklyn and Boston. In addition to the plumbing of houses, it is largely used in conveying water from springs and wells. Price 15 cents a pound for all sizes. Circulars and sample of pipe sent by mail, free. Address THE COLWELLS, SHAW & WILLARD MF'G CO., 213 Centre street, between Canal and Grand streets, New York. Also, manufacturers of Block Tin Pipe, Lead Pipe, Sheet Lead, Solder, &c. ORDERS SOLICITED. Ap 25-3m

PURE WATER

A MINING ENGINEER, A NATIVE OF CORNwall, England, of large experience, who has been superintending extensive copper mines in Sweden for several years, is desirous of an engagement in this country.

For economy of management and successful working, the most satisfactory references can be given ; also for general mining ability and strict integrity.

Applications can be made to

Mr. JOHN EVERITT,
j711-4t 168 Fulton street, New York.